

Draft

Environmental Assessment
for
Designation of Revised Critical Habitat
for the
Wintering Population of Piping Plover
in Texas

U.S. Department of the Interior
Fish and Wildlife Service
Region 2



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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

The U.S. Department of the Interior (USDI), Fish and Wildlife Service (Service) has prepared this Environmental Assessment (EA) to analyze potential effects to physical and biological resources and social and economic conditions that may result from designating revised critical habitat in Texas for the wintering population of Piping Plover (*Charadrius melodus*), which was listed as threatened under the Endangered Species Act of 1973 (ESA), as amended.

This EA will be used by the Service to decide whether or not revised critical habitat will be designated as proposed, if the proposed action requires refinement, or if further analyses are needed through preparation of an environmental impact statement. If the proposed action is selected as described or with minimal changes and no further environmental analyses are needed, a Finding of No Significant Impact will be prepared. This EA has been prepared pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA) as implemented by the Council on Environmental Quality regulations (40 CFR §1500, *et seq.*)¹ and Department of the Interior NEPA procedures.

This Environmental Assessment analyzes the potential effects of designating revised critical habitat along the Gulf coast in Texas for the wintering population of Piping Plover, which was listed in 1985 as threatened under the federal Endangered Species Act

The EA is organized in six chapters. Chapter 1 contains introductory information on critical habitat and the Piping Plover and describes the purpose of and need for the action. Chapter 2 describes the alternatives for critical habitat designation, including the No Action alternative, and provides a summary comparison of the effects of the alternatives. Chapter 3 presents the existing conditions and discloses the effects of the alternatives for critical habitat designation on relevant resource areas. Chapter 4 is the analysis of significance of the proposed action. Chapter 5 is the list of preparers of the EA, and Chapter 6 is a list of references cited in the EA.

1.2 Purpose and Need for Action

While the extinction of a species can and does occur naturally, the current rate of extinctions is estimated to be many times greater than the natural "background" rate, due to the effects of human actions (*e.g.* Wilson, 1992; Ward, 2004). Recognition that human activities "untempered by adequate concern and conservation" were causing species extinctions was the primary reason for enacting the Endangered Species Act of 1973 (*cf.* ESA §2[a][1]). In developing the law, Congress found that the biological diversity and natural heritage of the United States had "esthetic, ecological, educational, historical, recreational,

¹ CFR is an abbreviation of the Code of Federal Regulations, which can be accessed via the Internet at <http://www.gpoaccess.gov/cfr/index.html> (current web address as of 8 July 2008).

and scientific value to the Nation and its people” (*cf.* ESA §2[a][3]). The ESA is now the main federal law for protecting and recovering species that are in danger of extinction, thereby conserving the biological diversity and natural heritage of the United States.

Critical habitat is defined in the ESA as areas that are essential for the conservation² of a species (see section 1.4.1 below for an in-depth discussion of critical habitat). The Service is required to designate critical habitat, to the maximum extent prudent, at the time species are listed as threatened or endangered (ESA §4[a][3]; 50 CFR §424.12), or within defined time frames after listing if critical habitat is not determinable at the time of listing. Designation of critical habitat is not considered to be prudent when: 1) the species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species; or 2) designation of critical habitat would not be beneficial to the species (40 CFR §424.12[a][1]). The critical habitat provisions of the ESA are intended to provide protection of habitat that is essential to the conservation of listed species, which includes that habitat necessary for recovery of the species. A primary purpose of the ESA is to “provide a means whereby the ecosystems upon which endangered species and threatened species may be conserved” (ESA §2[b]).

The three breeding populations of Piping Plover were listed under the ESA in 1985. The Great Lakes breeding population was listed as endangered and the northern Great Plains and

Atlantic Coast breeding populations were listed as threatened (50 Federal Register 50726). The wintering population of Piping Plover was listed as threatened under the ESA on 11 December 1985 (50 Federal Register 50726). A final rule designating 137 areas along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas as critical habitat for the wintering population of the Piping Plover was published on 10 July 2001 (66 FR 36038). This designation included approximately 1,798 miles of mapped shoreline and approximately 165,211 acres of mapped areas along the Gulf and Atlantic coasts and along margins of interior bays, inlets, and lagoons. Thirty-seven critical habitat units totaling 54,750 acres were designated along the Gulf coast of Texas in the 2001 rule. In 2006, 19 of these 37 units (Texas Units 3, 4, 7, 8, 9, 10, 14, 15, 16, 17, 18, 19, 22, 23, 27, 28, 31, 32, and 33) totaling 38,447 acres were vacated by court order (Figure 1). The critical habitat designation of these units was remanded for reconsideration by the Service as a result of a Texas federal court ruling in 2006 (Texas General Land Office v. U.S. Department of the Interior *et al.*, No.06–cv–00032, Southern District of Texas).

The purpose of the proposed action is to designate revised critical habitat for wintering Piping Plover on the Texas Gulf coast in the court-vacated units. Critical habitat designation identifies geographic areas that are essential for conservation of Piping Plover. It also describes the physical and biological features that constitute critical habitat (*i.e.* primary constituent elements).

² Conservation is defined in the ESA as the use of “all methods and procedures which are necessary to bring any endangered or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary.”

Figure 1. Wintering Piping Plover critical habitat units in Texas that were vacated in 2006.



Conservation of the Piping Plover may benefit from proposed revised critical habitat designation. Each federal action that may affect designated critical habitat would be reviewed to analyze the effects of the action and its relationship to the function and conservation role of the critical habitat. Designation of revised critical habitat in the court-vacated units may also help focus conservation activities for the species, alert the public and land-management agencies to the importance of specific areas for their conservation, and identify areas that may require special management. The critical habitat provisions of the ESA were intended to address habitat requirements for conservation of listed species.

Habitat protection and management is essential for conservation of Piping Plover. Threats to habitat of the Piping Plover include: 1) disturbance of foraging and roosting plovers by humans, vehicles, and domestic animals; 2) predation, especially by falcons, hawks, coyotes, bobcats, and feral cats; and 3) modification and loss of habitat due to uncontrolled recreational access and beach stabilization efforts such as beach nourishment, beach maintenance, sediment dredging and disposal, inlet channelization, construction of jetties and other hard structures (73 Federal Register 29294: 29299).

Foraging and roosting Piping Plover may be disturbed by events that result in flushing birds or disrupting feeding or roosting and causing excessive alertness or abandonment of an area. Such disturbance can be caused by humans involved in recreational activities. Driving vehicles on the beach also can disturb foraging and roosting plovers, as can pets being allowed to run or roam freely on the beach. Predation rates on Piping Plover may increase above normal

because human activities increase predator abundance.

Habitat modification or loss may occur from beach maintenance activities that alter the natural movement of sediments along the ocean shoreline. Beach maintenance activities that may impact wintering Piping Plover habitat include beach nourishment, sediment dredging and disposal, inlet channelization, and construction of jetties and other hard structures. However, when these activities, in particular sediment dredging and disposal, mimic natural habitat elements, habitat may be created.

To address the threats affecting wintering Piping Plover within proposed revised critical habitat units, certain special management actions may be needed. For example, the high level of vehicle and pedestrian use of some areas may require managing access to Piping Plover foraging habitat and adjacent roosting habitat during migration and overwintering periods. Managing access to these foraging and roosting areas may assist in the protection of habitat and reduce Piping Plover disturbance and predation caused by vehicle use, pedestrians, and pets (73 Federal Register 29294: 29300).

1.3 Proposed Action

In May 2008, the Service published in the Federal Register a proposed designation of revised critical habitat for those 2001 court-vacated and remanded units in Texas located in Aransas, Brazoria, Calhoun, Cameron, Kenedy, Kleberg, Matagorda, Nueces, and Willacy counties. Critical habitat boundaries of the court-vacated Texas units were revised from the 2001 designation to reflect the more recent habitat conditions and were delineated using 2005 aerial imagery and refined mapping techniques (73 FR 29294: 29296-29297).

As a result, 18 of the 19 court-vacated Texas units are proposed for designation of revised critical habitat (Figures 5 through 24). Unit 17 was dropped during revised mapping, which delineated two parcels that were too small and disjunct to be considered as critical habitat (73 FR 29294:29299).

The revised critical habitat proposed includes 138,881 acres in the remaining 18 units which are composed of 24 units or subunits described in the 20 May 2008 proposed rule (73 FR 29294:29300). Those descriptions are summarized in this EA in Section 2.3.1. All of the units were occupied by Piping Plover at time of listing in 1985 and are currently occupied (73 FR 29294:29302-29310). Each unit includes sufficient primary constituent elements in the quantity and spatial arrangement to support life history functions essential for the conservation of the species where it winters (73 FR 29294:29299).

1.4 Background

1.4.1 Critical Habitat

1.4.1.1 Provisions of the ESA Section 4(a)(3) of the ESA states that critical habitat shall be designated to the maximum extent prudent and determinable and that such designation may be revised periodically, as appropriate. Section 4(b)(2) of the ESA requires that critical habitat designation be based on the best scientific and commercial information available and that economic and other impacts must be considered. Areas may be excluded from critical habitat designation if it is determined that the benefits of excluding them outweigh the benefits of their inclusion, unless failure to include the areas in critical habitat would result in extinction of the species.

Critical habitat is defined in section 3(5)(A) of the ESA as:

"(I) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of this Act, on which are found those physical and biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection;

and

(ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of this Act, upon a determination by the Secretary that such areas are essential for the conservation of the species."

Section 3(5)(C) also states that critical habitat "shall not include the entire geographical area which can be occupied by the threatened or endangered species" except when the Secretary of the Interior determines that the areas are essential for the conservation of the species.

Section 7(a)(2) of the ESA requires federal agencies to consult with the Service to "insure that any action authorized, funded, or carried out by such agency ... is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined ... to be critical." Each agency is required to use the best scientific and commercial data available. This consultation process is typically referred to as section 7 consultation. Section 7 of the ESA does not apply to state, local, or private land unless there is a

federal nexus (*i.e.* federal funding, authorization, or permitting).

Designation of critical habitat can help focus conservation activities by identifying areas that are essential to the conservation of the species, regardless of whether they are currently occupied by the listed species. Designation of critical habitat also serves to alert the public and land management agencies to the importance of an area for conservation of a listed species. As described above, critical habitat receives protection from destruction or adverse modification through required consultation under section 7 of the ESA. Aside from outcomes of consultation with the Service under section 7, the ESA does not automatically impose any restrictions on lands designated as critical habitat.

1.4.1.2 The Section 7 Consultation Process

The section 7 consultation process begins with a determination of effects on listed species and designated critical habitat by the federal action agency (Figure 2). If the federal action agency determines that there would be no effect on listed species or designated critical habitat, the proposed action is not altered or impacted by ESA considerations. If the federal action agency determines that listed species or designated critical habitat may be affected, then consultation with the Service is initiated.

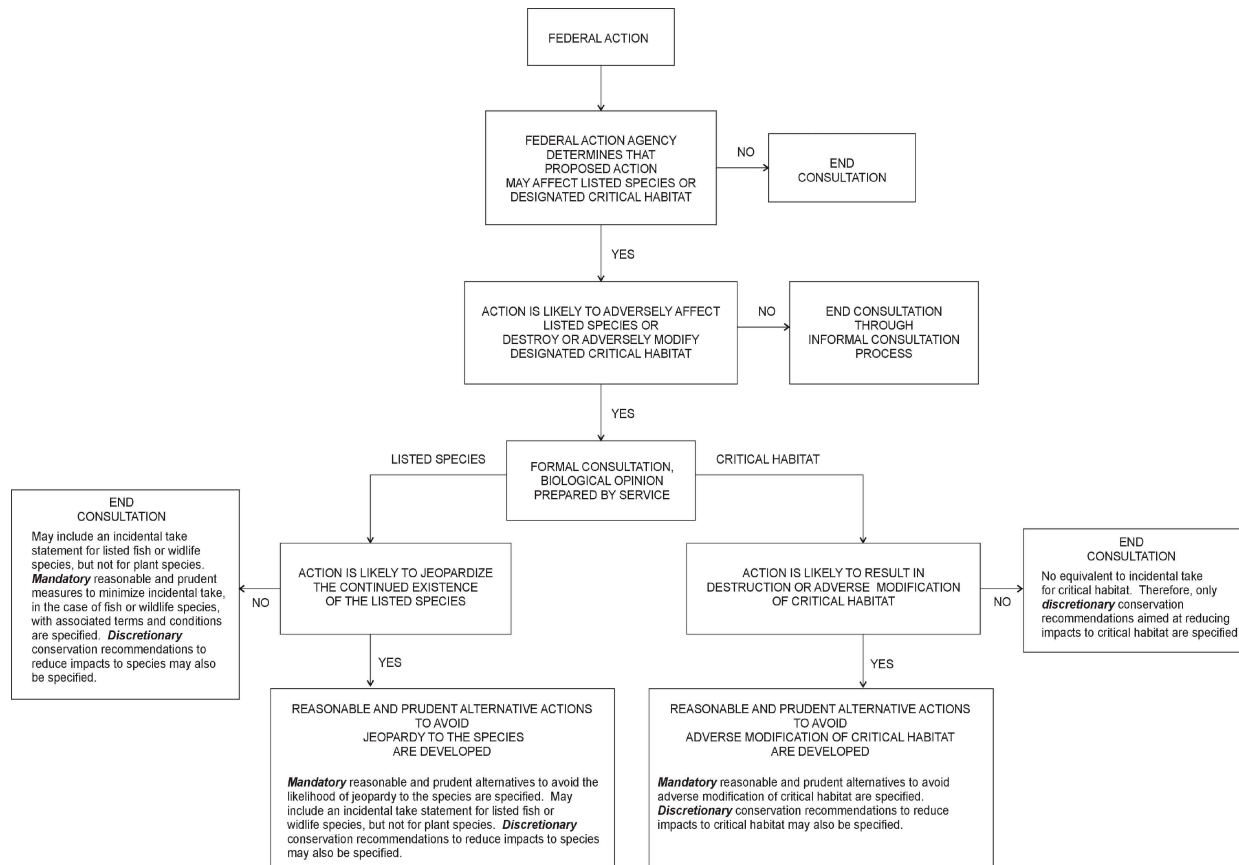
Once it is determined that the proposed federal action may affect a listed species or critical habitat, the federal action agency and the Service typically enter into informal section 7 consultation. Informal consultation is an optional process for identifying affected species and critical habitat, determining potential effects, and exploring ways to modify the action to remove or reduce adverse effects to listed species or critical habitat (50 CFR §402.13). The informal section 7 consultation process concludes in one of two

ways: 1) the Service concurs in writing that the proposed action is not likely to adversely affect listed species or critical habitat; or 2) adverse impacts are likely to occur and formal consultation is initiated.

Formal consultation is initiated when it is determined that the proposed federal action is likely to adversely affect a listed species or critical habitat (50 CFR §402.14). Formal consultation concludes with a biological opinion issued by the Service on whether the proposed federal action is likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of critical habitat (50 CFR §402.14[h]). Independent analyses are made under both the jeopardy and the adverse modification standards.

A “non-jeopardy” or “no adverse modification” opinion concludes consultation and the proposed action may proceed under the ESA. The Service may prepare an incidental take statement with reasonable and prudent measures to minimize take of listed fish or wildlife species, and associated, mandatory terms and conditions that describe the methods for accomplishing the reasonable and prudent measures (ESA §7[b][4]). Discretionary conservation recommendations may also be included in a biological opinion based on effects to species. Conservation recommendations, whether they relate to the jeopardy or adverse modification standard, are discretionary actions recommended by the Service. These recommendations may address minimizing adverse effects on listed species or critical habitat, identify studies or monitoring, or suggest how action agencies can assist species under their own authorities and section 7(a)(1) of the ESA. There are no ESA section 9 prohibitions for critical habitat.

Figure 2. Simplified diagram of the ESA section 7 consultation process showing the parallel track for listed species and designated critical habitat. The informal section 7 consultation process leading to a determination of no adverse effect to listed species or designated critical habitat is not portrayed in detail.



Therefore, a biological opinion that concludes no destruction or adverse modification of critical habitat may contain conservation recommendations but would not include an incidental take statement, reasonable and prudent measures, or terms and conditions.

In a biological opinion that results in a jeopardy or adverse modification conclusion, the Service develops mandatory reasonable and prudent alternatives to the proposed action. Reasonable and prudent alternatives are actions that the

federal agency can take to avoid jeopardizing the continued existence of the species or adversely modifying critical habitat. The Service may develop reasonable and prudent alternatives that vary from slight project modifications to extensive redesign or relocation of the project, depending on the situations involved. Reasonable and prudent alternatives must be consistent with the intended purpose of the proposed action and they also must be consistent with the scope of the federal agency's legal authority. Furthermore, the reasonable and prudent alternatives must be economically and technically feasible.

A biological opinion that results in a jeopardy finding, based on effects to the species, may also include an incidental take statement in the case of listed fish or wildlife species, reasonable and prudent measures, terms and conditions, and conservation recommendations. In the case of plant species, no incidental take statement is prepared. A biological opinion that results in an adverse modification finding may include reasonable and prudent alternatives and conservation recommendations but no incidental take statement or associated reasonable and prudent measures and terms and conditions.

1.4.1.3 Primary Constituent Elements In accordance with section 3(5)(A)(I) of the ESA and regulations at 50 CFR §424.12, the Service is required to consider those physical and biological habitat features, called primary constituent elements, that are essential to conservation of the species. Primary constituent elements include: 1) space for individual and population growth and for normal behavior; 2) food, water, air, light, minerals, or other nutritional or physiological requirements; 3) cover or shelter; 4) sites for breeding, reproduction, or rearing (or development) of offspring; and 5) habitats that are protected from disturbance or are representative of the historic, geographical, and ecological

distributions of a species (73 Federal Register 29294: 29297). Eight primary constituent elements are defined for the wintering population of Piping Plover (73 Federal Register 29294: 29298).

- 1) Intertidal sand beaches (including sand flats) or mud flats (between annual low tide and annual high tide) with no or very sparse emergent vegetation for feeding. In some cases, these flats may be covered or partially covered by a mat of blue-green algae.
- 2) Unvegetated or sparsely vegetated sand, mud, or algal flats above annual high tide for roosting. Such sites may have debris or detritus and may have micro-topographic relief (less than 20 inches) above substrate surface) offering refuge from high winds and cold weather.
- 3) Surf-cast algae for feeding.
- 4) Sparsely vegetated backbeach, which is the beach area above mean high tide seaward of the dune line, or in cases where no dunes exist, seaward of a delineating feature such as a vegetation line, structure, or road. Backbeach is used by plovers for roosting and refuge during storms.
- 5) Spits, especially sand, running into water for foraging and roosting.
- 6) Salterns, or bare sand flats in the center of mangrove ecosystems that are found above mean high water and are only irregularly flushed with sea water.
- 7) Unvegetated washover areas with little or no topographic relief for feeding and roosting. Washover areas are formed and maintained by

the action of hurricanes, storm surges, or other extreme wave actions.

- 8) Natural conditions of sparse vegetation and little or no topographic relief mimicked in artificial habitat types (e.g. dredge spoil sites).

1.4.2 Background Information on Piping Plover

1.4.2.1 Description Piping Plover (*Charadrius melodus*) is in the family Charadriidae, which is the second-largest family of shorebirds. Piping Plover is a small, stocky shorebird, typically about seven and a quarter inches long, with a wing span of 14 to 15.5 inches. Adults typically weigh about 1.9 ounces. The back of the bird is sandy brown and the underside is white. The forehead and lores (i.e. the area between the eye and the bill) are also white. There is a narrow breast band that is blackish to sandy colored, which may be incomplete in wintering birds. After birds arrive on their wintering grounds, they undergo a molt which produces characteristic winter coloration (Figure 3; Elphick *et al.*, 2001: 258). Wintering birds have dark orange legs and a black to blackish-orange, stubby bill (Sibley, 2003: 144; National Geographic Society, 2002: 154; Alsop, 2001: 221). Adult Piping Plover undergo another molt before nesting, which produces breeding colors. Co-occurring wintering birds similar in appearance to Piping Plover include Snowy Plover (*Charadrius alexandrinus*) and Semipalmated Plover (*Charadrius semipalmatus*). Snowy Plover has dark gray legs and a partial breast band. Semipalmated Plover has a dark brown back and breast band.

1.4.2.2 Distribution Piping Plover breeds in three areas in North America: the Great Plains; the Great Lakes; and the Atlantic Coast (Figure 4; 73 FR 29294: 29295). The Great Plains breeding area extends from Kansas and eastern Colorado

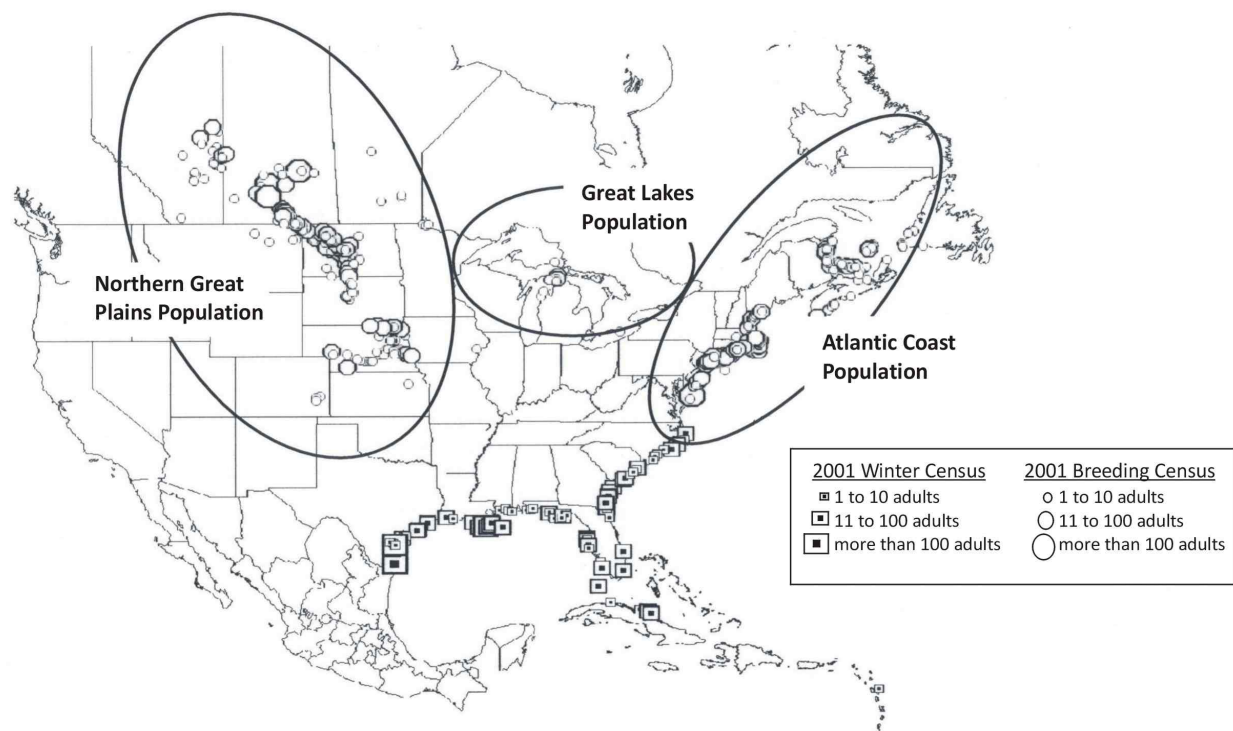
northward through the Nebraska, Iowa, the Dakotas, and northeastern Montana into southeastern Alberta east to southwestern Ontario. The Great Lakes breeding area includes beaches along lakes Superior, Michigan, and Huron in northern Michigan and Wisconsin. The Atlantic Coast breeding area consists of beach habitats extending from New Brunswick south to North Carolina and, historically, to South Carolina (Haig and Elliott-Smith, 2004).

Piping Plover winters in the United States along the Atlantic Coast from North Carolina south to Florida and coastal areas along the Gulf of Mexico from Florida to Texas (Haig and Elliott-Smith, 2004). Birds also may winter along coastal areas in Mexico and into the Caribbean Islands including Cuba and the Bahamas (Nicholls and Baldassarre, 1990). Piping Plover from the Great Plains breeding area winter mainly on the Gulf coast, while birds from the Atlantic coast breeding area winter mainly along the southern Atlantic Coast. However, birds may cross over to the Gulf or Atlantic coasts to winter (Haig and Elliott-Smith, 2004). Therefore, wintering Piping Plover on the Texas coast of the Gulf of Mexico may be from any of the three breeding areas (73 FR 26294: 29295). It appears that individual birds return to the same general wintering area year after year (Haig and Elliott-Smith, 2004).

Figure 3. A wintering Piping Plover at Padre Island National Seashore, 10 January 2008. Photograph credit: K. Yori, Blue Earth Ecological Consultants, Inc.



Figure 4. Distribution of breeding and wintering piping plovers in North America (excerpted from U.S. Fish and Wildlife Service, 2003a:2).



1.4.2.3 Reproduction and Life History Piping Plover form pairs after arriving at breeding areas in early spring, which ranges from mid-March at southern sites to early May at northern sites. Males scrape shallow nest sites in open sandy or gravelly areas and line them with materials including pebbles and shell fragments (Haig and Elliott-Smith, 2004; Elphick *et al.*, 2001: 262). Piping Plover is typically monogamous and breeds once a year unless a nesting attempt is unsuccessful. Clutch size is usually three or four

eggs. Eggs are incubated for about 25 to 28 days. Incubation time is shorter for clutches laid later in the season (Haig and Elliott-Smith, 2004). Chicks are able to walk and forage several hours after hatching (*i.e.* they are precocial) but require frequent brooding by adults, especially during the first two weeks or so, to maintain proper body temperature. Young are capable of sustained flight about 20 to 35 days after hatching. Family groups are maintained through fledging and often into the migration to wintering grounds (Haig and

Elliott-Smith, 2004). Migration to winter areas begins in late summer and continues through the fall. Piping Plover begin arriving on their wintering grounds in late July, although most wintering birds arrive at the Texas coast in August and September. Piping Plovers begin leaving the wintering grounds in late February and by mid-May, almost all wintering birds have left the Texas coastal areas for their nesting grounds.

1.4.2.4 Habitat Habitat of wintering Piping Plover along the Texas coast can be broadly characterized as emergent tidal or washover areas that are unvegetated to sparsely vegetated with wet to saturated soils in close proximity to water (Drake, 1999a; Drake 1999b; Zonick, 2000). The Texas coastal areas used by wintering Piping Plover can be divided into three ecosystems based on the factors that control tides, salinity levels, and intertidal climax vegetation (Zonick, 2000: 13; refer to the Appendix for depictions and examples of ecosystem features). The first of these three Texas coastal ecosystems is the estuarine bay ecosystem, extending from the the Bolivar Peninsula south to Aransas Pass. It is characterized by a tidal pattern controlled by forces of the sun and moon, brackish salinities, and cordgrass (*Spartina alterniflora*) as the climax intertidal vegetation (Zonick, 2000: 12). The second ecosystem is the hypersaline (*i.e.* very salty) lagoon ecosystem, extending from Packery Channel south to the Rio Grande. Tides in the lagoon ecosystem are controlled primarily by winds and changes in atmospheric pressure. Salinities are high and the climax intertidal community is blue-green algal flats dominated by *Lyngbya confervoides* (Zonick, 2000: 14). Between the estuarine bay ecosystem and the hypersaline lagoon ecosystem is an ecotone (*i.e.* transition zone), which extends from Aransas Pass south to the Packery Channel. The ecotone area has tides controlled by a combination of astronomical and climatological factors, salinities

varying from brackish to hypersaline, and climax communities characterized by a mixture of cordgrass and blue-green algal flats (Zonick, 2000: 14).

Within these three ecosystems, wintering Piping Plover uses coastal areas on the mainland and habitats on barrier islands, both on the bay side (*i.e.* bayshore habitats) and on the ocean side (*i.e.* ocean beaches). Bayshore tidal sand and algal flats are primary areas used by wintering Piping Plover along the Texas coast, but oceanside beaches, washover passes, and mainland tidal mud flats provide essential secondary habitat when bayshore tidal flats are submerged (Drake, 1999a: 18; Zonick, 2000: 56; see Appendix). For example, northern storm fronts typically create seiches, or tidal surges, in the lagoon ecosystem that inundate bayshore tidal flats (Drake, 1999a: 17). During these times, wintering Piping Plover move to ocean beaches, mainland tidal flats, and washover passes. Washover passes can be particularly important secondary habitats when tropical storm events occur that submerge all tidal flat habitats in the lagoon ecosystem for extended periods of time (Zonick, 2000: 158).

1.4.2.5 Food Wintering Piping Plover feed on a variety of invertebrates such as marine worms, amphipods, and terrestrial and benthic insects (Elphick *et al.*, 2001: 260). Along the Texas coast, diet of wintering Piping Plover varies by ecosystem and habitat (Table 1; Zonick, 2000:106-108). Polychaete worms and surface-dwelling arthropods such as amphipods and insects are particularly important food items for wintering Piping Plover along the Texas coast (Table 1).

Table 1. Major food items of wintering Piping Plover on the Texas coast. Numbers are the percent of total food items taken by Piping Plover at beach and bayshore habitats in the three coastal ecosystems (data from Zonick, 2000: 106).

Ecosystem	Food Item					
	Polychaete Worms		Surface-Dwelling Arthropods		Other	
	Beach	Bayshore	Beach	Bayshore	Beach	Bayshore
Bay	59.5	80.4	22.0	5.4	18.5	14.2
Ecotone	70.2	41.4	19.2	30.5	10.6	22.1
Lagoon	97.7	19.1	2.3	79.4	0	1.5

1.5 Permits Required for Implementation

No permits are required for critical habitat designation. Designation of critical habitat occurs through a rule-making process under the Administrative Procedures Act and the ESA.

1.6 Related Laws, Authorizations, and Plans

Related provisions of the ESA require federal agencies to consult with the Service when there are potential effects to endangered or threatened species, independent of critical habitat.

Piping Plover is listed as a threatened species in Texas (31 Texas Administrative Code §65.175). Texas state law specifies that no person may "take, possess, propagate, transport, export, sell or offer for sale any species of fish or wildlife listed by the department as threatened" unless that person has a valid out-of-state permit, bill of sale, or notarized affidavit indicating that the specimen was legally obtained (31 Texas Administrative

Code §65.171) or has a letter of authorization from the Texas Parks and Wildlife Department (31 Texas Administrative Code §65.173). Texas law does not contain any provisions for protection of habitat of listed species.

Habitats occupied by Piping Plover are subject to regulation under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act. Section 404 of the federal Clean Water Act (33 U.S.C. 1251-1376) regulates dredge and fill activities in waters of the United States, including jurisdictional wetlands. Section 10 of the Rivers and Harbors Act (33 U.S.C. 403) regulates placement of structures, excavation, and placement of fill in navigable waterways of the U.S. The National Environmental Policy Act requires federal agencies to analyze and disclose to the public the environmental impacts of their actions, including potential effects on listed species such as Piping Plover.

There are no recovery plans specifically for wintering populations of Piping Plover. However, recovery plans for the three breeding populations of Piping Plover have been completed and each of those plans addresses wintering grounds. None of

the recommended recovery actions specified in any of the three recovery plans are mandatory. Implementation of the plans is discretionary.

In 1988, a combined recovery plan for the Great Lakes and northern Great Plains populations was completed (U.S. Fish and Wildlife Service, 1988a), as was a recovery plan for the Atlantic coast breeding population (U.S. Fish and Wildlife Service, 1988b). Subsequently, the Service concluded that recovery of the Great Lakes and northern Great Plains breeding populations would be best served with individual plans, so a plan specifically for the Great Lakes population was developed (U.S. Fish and Wildlife Service, 2003a). The recovery plan for the Atlantic coast breeding population was revised in 1996 (U.S. Fish and Wildlife Service, 1996).

The goals of the three recovery plans are similar in that they target an increase in breeding pairs and eventual delisting. Recovery objectives in the Great Lakes plan are an increase to at least 150 breeding pairs, with a five-year average fecundity of 1.5 to 2.0 fledglings per pair per year, and to "ensure protection and long-term maintenance of essential breeding and wintering habitat, sufficient in quantity, quality, and distribution to support the recovery goal of 150 pairs" (U.S. Fish and Wildlife Service, 2003a: 49). The latter objective pertains specifically to wintering grounds, including those along the Texas coast. The broad recovery action associated with this objective is to "protect wintering piping plovers and manage habitat to promote survival and recruitment" (U.S. Fish and Wildlife Service, 2003a: 67-70).

The recovery objectives for the northern Great Plains breeding population are to: 1) increase breeding pairs to 1,300; 2) maintain a stable breeding population for 15 years; and 3) to protect essential breeding and wintering habitat (U.S. Fish and Wildlife Service, 1988a: 54). Recommended

recovery actions pertaining to habitat along the Texas coast include managing habitat to maximize survival of wintering Piping Plover and implementing various strategies to protect habitat (U.S. Fish and Wildlife Service, 1988a: 59-62).

Objectives of the Atlantic coast breeding population recovery plan are to increase and maintain for five years a total of 2,000 breeding pairs, verify that this breeding population size is sufficient to conserve genetic diversity, achieve a five-year average productivity of 1.5 fledged chicks per pair, institute long-term agreements to ensure conditions sufficient to meet population and productivity goals, and to "ensure long-term maintenance of wintering habitat, sufficient in quantity, quality, and distribution to maintain survival rates for a 2,000-pair population" (U.S. Fish and Wildlife Service, 1996: 57-58). Similar to the Great Lakes recovery plan, this last objective pertains to wintering habitat along the Texas coast. Recommended recovery actions tied to this objective include monitoring wintering populations and protecting essential wintering habitat by preventing habitat degradation and disturbance (U.S. Fish and Wildlife Service, 1996: 59-60).

1.7 Issues

Issues are defined as concerns about the potential effects of the proposed action. Issues associated with the proposed action were identified from written comments received during the public comment period from 20 May 2008 to 21 July 2008 for the proposed rule to designate revised critical habitat for wintering Piping Plover along the Texas Gulf coast (73 Federal Register 29294). Issues identified during scoping were:

- critical habitat designation should include all occupied habitat, including national wildlife refuge lands;

- critical habitat designation necessary to provide for recovery of the species should include sufficient unoccupied habitat to allow for response to changing climate conditions and to protect the species from human-related disturbances;
- off-road vehicles should be prohibited on all Piping Plover habitat within the national wildlife refuge system, and any actions on other lands requiring the use of off-road vehicles in plover habitat should require consultation;
- the economic analysis must analyze benefits of critical habitat designation;
- designation of revised critical habitat may result in delays in gaining access for seismic operations (necessary for oil and gas exploration and development) in Piping Plover habitat that may result in increased production costs;
- designation of revised critical habitat may restrict the strategic location of oil and gas wells that would otherwise maximize production and minimize environmental impacts;
- the updated mapping methodology used to designate revised critical habitat in regards to identification of the mean lower low water line may be faulty, resulting in flawed boundaries; and
- defining occupied habitat as that being occupied at least two of 10 years may result in overestimating the amount of occupied habitat due to ever-changing conditions along the coastline.

2.0 ALTERNATIVES, INCLUDING THE NO ACTION ALTERNATIVE

2.1 Development of Alternatives

Identification of areas essential for the conservation of Piping Plover is the cornerstone of critical habitat designation. The Service made a reassessment of areas needed for the conservation of Piping Plover based on the best scientific and commercial information available concerning the present and historic range of the species, its habitat and biology, and threats. This assessment and issues identified during comment on the proposed rule served as the basis for developing critical habitat designation alternatives.

2.2 Alternative A - No Action

The No Action alternative is defined as no designation of revised critical habitat for the wintering Piping Plover in the 18 vacated Texas units. Critical habitat designation would remain in effect in the 18 units that were not vacated by court order (*i.e.* units 1, 2, 5, 6, 11, 12, 13, 20, 21, 24, 25, 26, 29, 30, 34, 35, 36, and 37; Table 2). These critical habitat units that were not vacated by court order total about 16,303 acres (Table 2). Analysis of the No Action alternative is required by NEPA, and it serves as a baseline for analyzing effects of action alternatives. However, it is not clear that the Service could, under the law, adopt the No Action alternative.

2.3 Alternative B - Proposed Action

Alternative B would designate revised critical habitat in 18 of the 19 court-vacated critical habitat units (Figure 1), as described in the 20 May 2008 proposed rule (73 FR 29294). One of the originally-vacated units (Unit TX-17) has not been proposed for redesignation due to its small size after mapping refinements were made (73 FR 29294). This alternative would designate 138,881 acres of revised critical habitat for wintering Piping Plover in Texas (Table 2). All units were occupied at time of listing in 1985 and are currently occupied (73 FR 29294). The other 18 critical habitat units in Texas that were designated in 2001 and were not vacated by court order would remain in place. Each unit is described briefly in the next section. Refer to 73 FR 29294 for greater detail, including latitude and longitude descriptions. Land ownership information for each unit is contained in Table 3.

Table 2. Designated, vacated, and proposed wintering Piping Plover critical habitat units along the Texas Gulf coast.

Unit Number	Acres Designated 2001	Vacated	Acres Proposed 2008
TX-1	7,217	no	n/a
TX-2	6	no	n/a
TX-3	26,983	yes	107,673
TX-4	12,307	yes	17,218
TX-5	1,076	no	n/a
TX-6	596	no	n/a
TX-7	104	yes	295
TX-8	239	yes	620
TX-9	323	yes	171
TX-10	216	yes	344
TX-11	5	no	n/a
TX-12	6	no	n/a
TX-13	435	no	n/a
TX-14	481	yes	590
TX-15	1,106	yes	805
TX-16	463	yes	1,376
TX-17	14	yes	0
TX-18	7,539	yes	2,467
TX-19	976	yes	2,419
TX-20	982	no	n/a
TX-21	2,133	no	n/a
TX-22	1,114	yes	545
TX-23	769	yes	1,808
TX-24	1,868	no	n/a
TX-25	575	no	n/a

Table 2, continued

TX-26	13	no	n/a
TX-27	728	yes	906
TX-28	321	yes	478
TX-29	294	no	n/a
TX-30	297	no	n/a
TX-31	410	yes	399
TX-32	269	yes	555
TX-33	388	yes	212
TX-34	272	no	n/a
TX-35	117	no	n/a
TX-36	395	no	n/a
TX-37	16	no	n/a
Total	54,750	-	138,881

Table 3. Surface land ownership and acreage information for each parcel proposed for revised critical habitat designation for the wintering Piping Plover in Texas. Percent of total acres is shown in parentheses.

Unit or Subunit Number	Total Proposed Acreage	Acreage by Land Ownership			
		Federal	State	County	Private
TX-3A	2,888	728 (25.2)	287 (9.9)	28 (1.0)	1,845 (63.9)
TX-3B	44,083	18,778 (42.6)	16,583 (37.6)	0 (0.0)	8,722 (19.8)
TX-3C	50,855	0 (0.0)	46,027 (90.5)	0 (0.0)	4,828 (9.5)
TX-3D	269	0 (0.0)	212 (78.8)	0 (0.0)	57 (21.2)
TX-3E	9,578	0 (0.0)	398 (4.2)	0 (0.0)	9,180 (95.8)
TX-4	17,218	6,300 (36.8)	8,576 (49.8)	0 (0.0)	2,342 (13.6)
TX-7	295	0 (0.0)	143 (48.5)	0 (0.0)	152 (51.5)
TX-8	620	0 (0.0)	357 (57.6)	5 (0.8)	248 (40.0)
TX-9	171	0 (0.0)	169 (98.8)	0 (0.0)	2 (1.2)
TX-10A	12	0 (0.0)	8 (66.7)	0 (0.0)	4 (3.3)
TX-10B	3	0 (0.0)	3 (100.0)	0 (0.0)	0 (0.0)
TX-10C	329	0 (0.0)	237 (72.0)	0 (0.0)	92 (28.0)
TX-14	590	0 (0.0)	12 (2.0)	0 (0.0)	578 (98.0)
TX-15	805	0 (0.0)	154 (19.1)	0 (0.0)	651 (80.9)
TX-16	1,376	15 (1.1)	691 (50.2)	0 (0.0)	670 (48.7)
TX-18	2,467	115 (4.7)	2 (0.1)	0 (0.0)	2,350 (95.3)
TX-19	2,419	2,135 (88.3)	284 (11.7)	0 (0.0)	0 (0.0)
TX-22	545	0 (0.0)	325 (59.6)	0 (0.0)	220 (40.4)
TX-23	1,808	0 (0.0)	877 (48.5)	0 (0.0)	931 (51.5)
TX-27	906	0 (0.0)	481 (53.1)	0 (0.0)	425 (46.9)
TX-28	478	0 (0.0)	146 (30.5)	0 (0.0)	332 (69.5)
TX-31	399	119 (29.8)	193 (48.4)	0 (0.0)	87 (21.8)
TX-32	555	0 (0.0)	555 (100.0)	0 (0.0)	0 (0.0)
TX-33	212	0 (0.0)	212 (100.0)	0 (0.0)	0 (0.0)
Total	138,881	28,190 (20.3)	76,932 (55.4)	33 (0.0)	33,716 (24.3)

2.3.1 Critical Habitat Unit Descriptions

2.3.1 Unit TX-3 Padre Island. This unit consists of four subunits as described below.

Subunit TX-3A South Padre Island, Gulf of Mexico shoreline (Figure 5). This subunit consists of 2,888 acres in Cameron and Willacy counties. It is a beach 30 miles in length on the Gulf side of South Padre Island, which is a barrier island. The subunit is located within an area bounded on the south by the southern boundary of Andy Bowie County Park and on the north by the south jetty of Mansfield Channel, which divides North and South Padre Islands. The eastern boundary is the estimated mean lower low water line (MLLW) of the Gulf of Mexico, and the western boundary is the dune line where the habitat changes from sandy beach to vegetated dunes.

Approximately one-quarter of the subunit is in federal ownership (Table 3) and is managed by the Service's Laguna Atascosa National Wildlife Refuge. Approximately 64 percent is in private ownership. Ten percent is state land managed by the Texas General Land Office, and a small portion at the southern end is Cameron County land managed as Andy Bowie County Park.

Subunit TX-3B South Padre Island, Laguna Madre side (Figure 5). This bayside subunit consists of 44,083 acres in Cameron and Willacy counties. Its southern boundary extends from the Gulf of Mexico west, paralleling an existing man-made dike, to the edge of the intertidal mudflats bordering the eastern shore of the lower Laguna Madre. The man-made dike is not within the boundary of the subunit. The northern boundary is Mansfield Channel. The eastern boundary is dense vegetation or, where there is no dense vegetation or dune, the boundary of subunit TX-

3A. The western boundary is the western edge of the intertidal mudflats bordering the eastern shore of the lower Laguna Madre.

Approximately 42 percent of the land is federally-owned (Table 3) and managed by the Service's Laguna Atascosa National Wildlife Refuge. Approximately 38 percent is state-owned and managed by the Texas General Land Office. The remainder is in private ownership.

Subunit TX-3C North Padre Island, Laguna Madre side (Figure 6). This bayside unit consists of 50,855 acres in Kenedy and Kleberg counties. It is in the Laguna Madre and extends from the western boundary of Padre Island National Seashore to the Gulf Intracoastal Waterway. The northern boundary of the subunit is a line extending westward from the Padre Island National Seashore, and its southern boundary is a line extending westward from the southern boundary of Padre Island National Seashore along the northern edge of the Mansfield Channel. Most of the land is state-owned and managed by the Texas General Land Office. A small portion is in private ownership (Table 3).

Figure 5. Piping Plover proposed revised critical habitat units TX-3A and TX-3B.

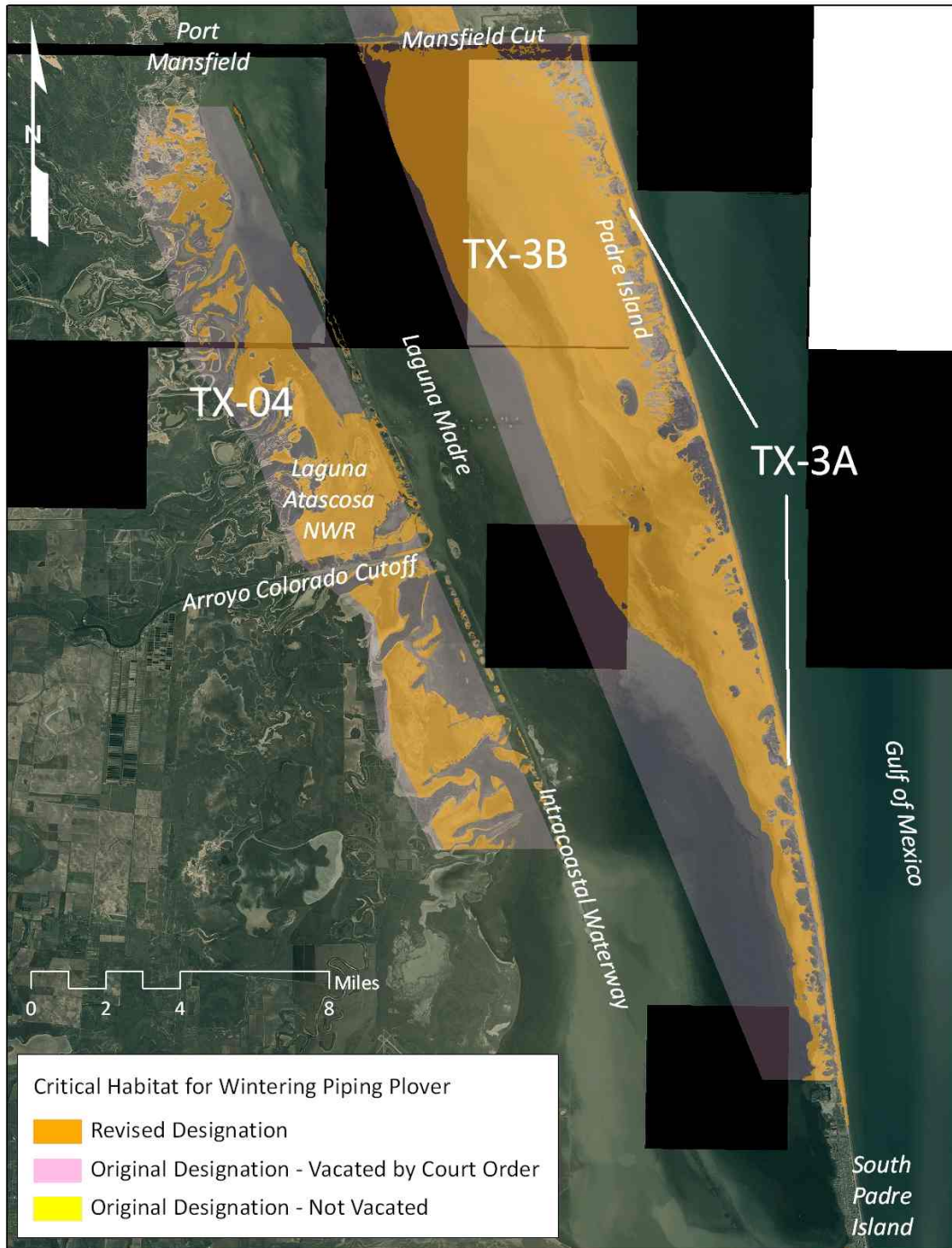
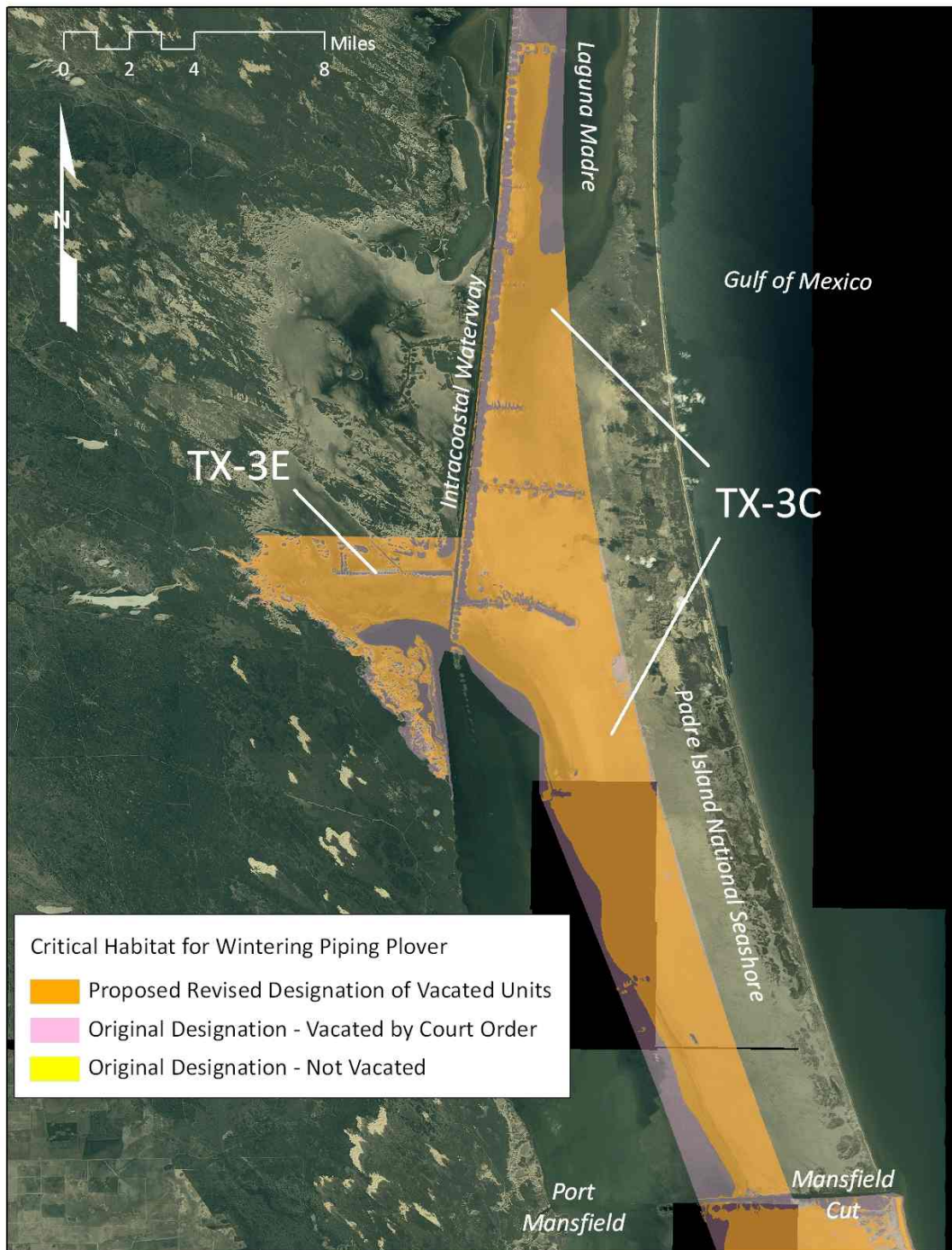


Figure 6. Proposed revised critical habitat units TX-3C and TX-3E.



Subunit TX-3D North Padre Island, Gulf of Mexico (Figure 7). This Gulf-side subunit consists of 269 acres of beach in Kleberg County. It extends along the Gulf shore of North Padre Island from the northern boundary of Padre Island National Seashore northward 6.2 miles to the Nueces County line. The southern boundary is the north boundary of the northeast section of the Padre Island National Seashore. The subunit extends eastward to the MLLW of the Gulf of Mexico and the western boundary runs along the dune line where the habitat changes from lightly-vegetated, sandy beach to densely-vegetated dunes. Most of the land is owned by the state and is managed by the Texas General Land Office. Approximately one-fifth is in private ownership (Table 3).

Subunit TX-3E North Padre Island, Mesquite Rincon (Figure 6). This triangular bayside subunit of 9,578 acres lies on the western shore of the lower Laguna Madre in Kleberg County. The subunit is generally bounded by Rincon de la Soledad on the southwestern side, Mesquite Rincon on the north, and the Gulf Intracoastal Waterway and Rincon de San Jose on the east. Most of the land is in private ownership with a small portion that is state-owned and managed by the Texas General Land Office (Table 3).

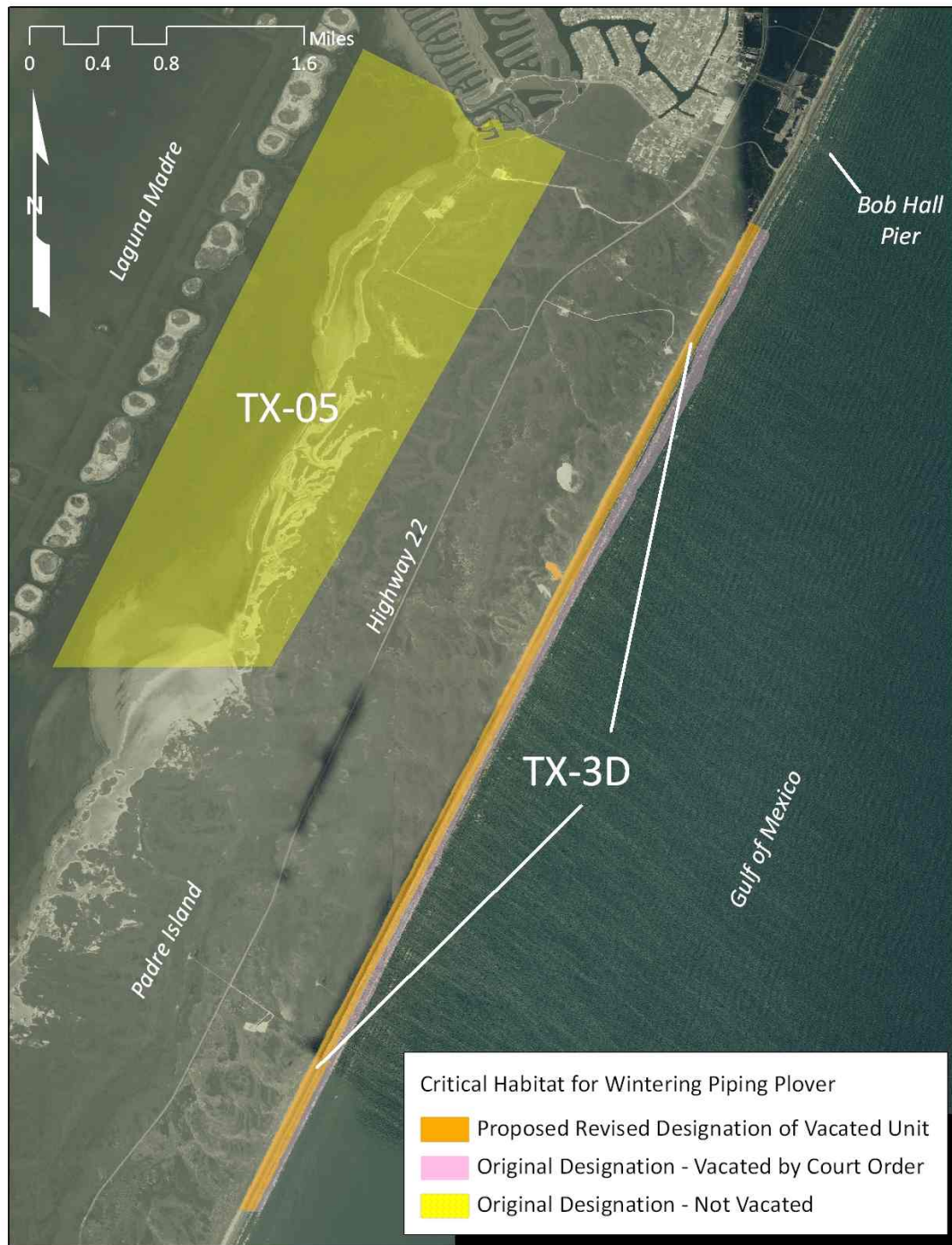
2.3.2 Unit TX-4 Lower Laguna Madre Mainland. This bayside unit consists of 17,218 acres in Cameron and Willacy counties and lies along the western shoreline of the Lower Laguna Madre (Figure 8). The southern boundary is an east-west line at the northern tip of Barclay Island.

The northern boundary is an east-west line located near the northern tip of El Sauz Island, approximately 1.2 miles south of the center of the city of Port Mansfield in Willacy County. The eastern boundary of the unit is the eastern edge of the line of dredge spoils that parallel the western side of the Gulf Intracoastal Waterway. The

western boundary is the edge of the sandy beach and mudflat habitat. Approximately one-third of this unit is within the Service's Laguna Atascosa National Wildlife Refuge. Approximately one-half is State-owned and managed by the General Land Office. The remainder is in private ownership (Table 3).

2.3.3 Unit TX-7 Newport Pass/Corpus Christi Pass Beach. This unit consists of 295 acres in Nueces County. It is a Gulf-side beach unit approximately 5.1 miles long. The southern boundary is the extension of Saint Bartholomew Avenue, adjacent to the north end of the seawall (Figure 9). The northern boundary is the edge of the south jetty of Fish Pass at Mustang Island State Park. The eastern boundary is MLLW of the Gulf of Mexico, and the western boundary runs along the dune line where the habitat changes from lightly vegetated, sandy beach to densely vegetated dune. This unit is in state and private ownership (Table 3). The state portion is managed as Mustang Island State Park by Texas Parks and Wildlife Department.

Figure 7. Piping Plover proposed revised critical habitat unit TX-3D.



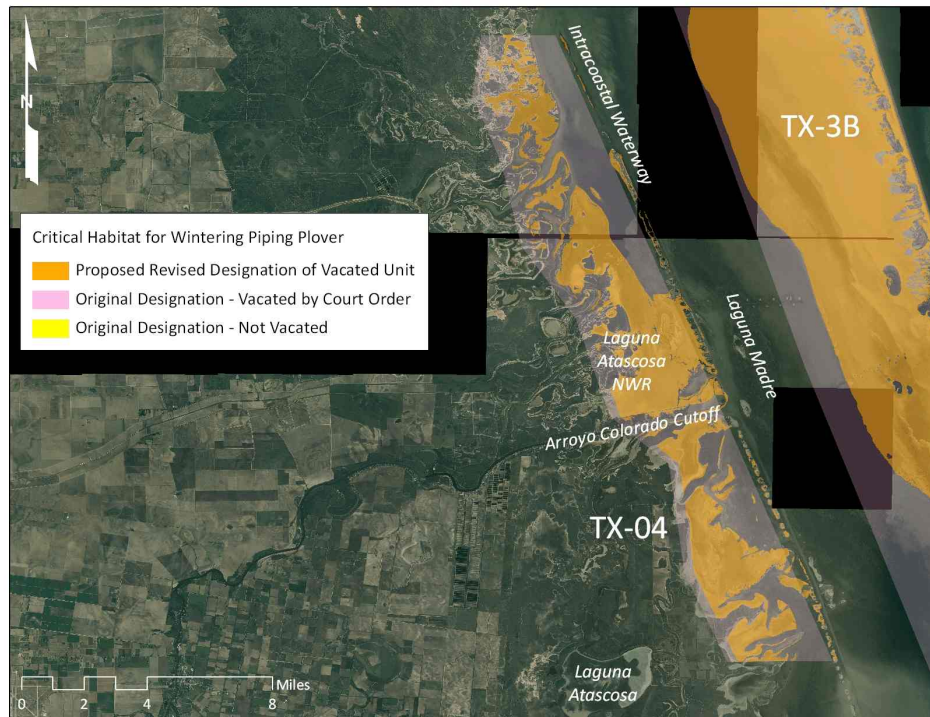


Figure 8. Piping Plover proposed revised critical habitat unit TX-4.

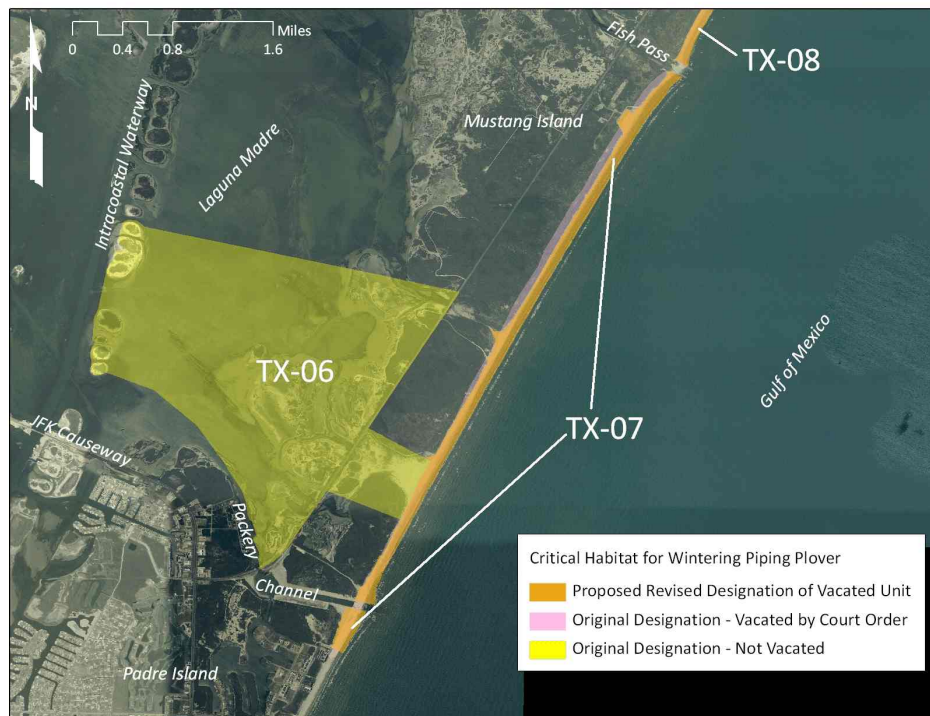


Figure 9. Piping Plover proposed revised critical habitat unit TX-7.

2.3.4 Unit TX-8 Mustang Island Beach. This unit consists of 620 acres in Nueces County. It is a Gulf-side beach unit approximately 12.5 miles long (Figure 10). The southern boundary is the edge of the north jetty of Fish Pass at Mustang Island State Park. The northern boundary is the south side of the Horace Calder Pier in Port Aransas, Texas. The unit is bounded on the east by the MLLW of the Gulf of Mexico, and on the west by the dune line where the habitat changes from lightly-vegetated sandy beach to densely vegetated dunes. The unit is in state and private ownership and includes a small municipal park owned and managed by the City of Port Aransas (Table 3). The state land is managed by the Texas General Land Office.

2.3.5 Unit TX-9 Fish Pass Lagoons. This bayside unit consists of 171 acres in Nueces County (Figure 10). This unit encompasses flats facing Corpus Christi Bay that extend 0.6 miles on either side of Fish Pass (Figure 11). The inland boundary is a line of dense vegetation, and the bayside boundary is the northeast edge of the tidal sand flats. Most of the unit is owned by the state and managed by the Texas General Land Office (Table 3). A few acres are in private ownership.

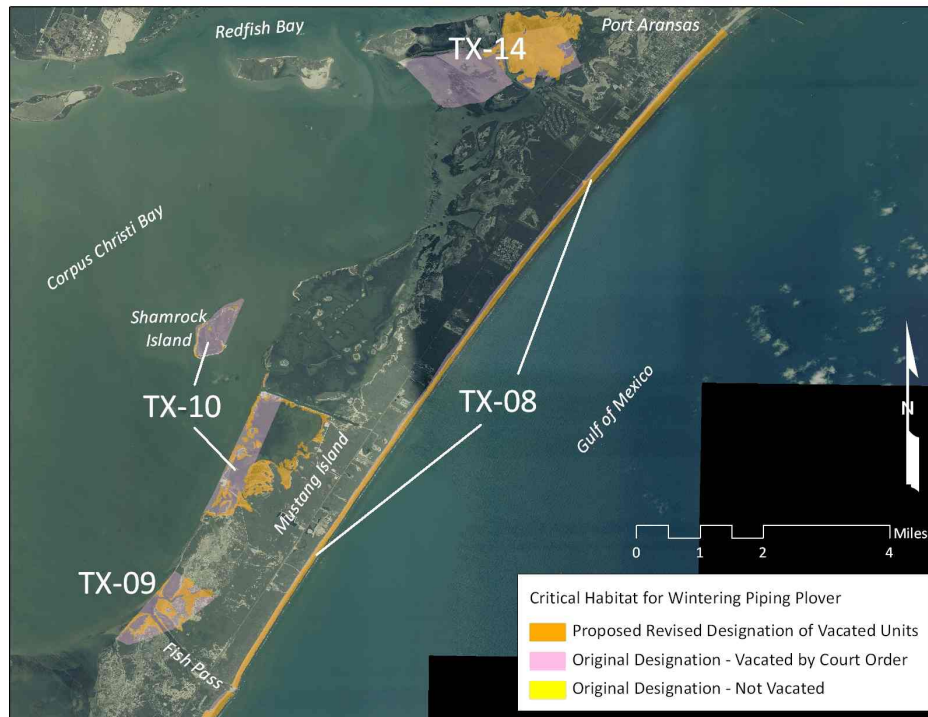


Figure 10. Piping Plover proposed revised critical habitat unit TX-8.

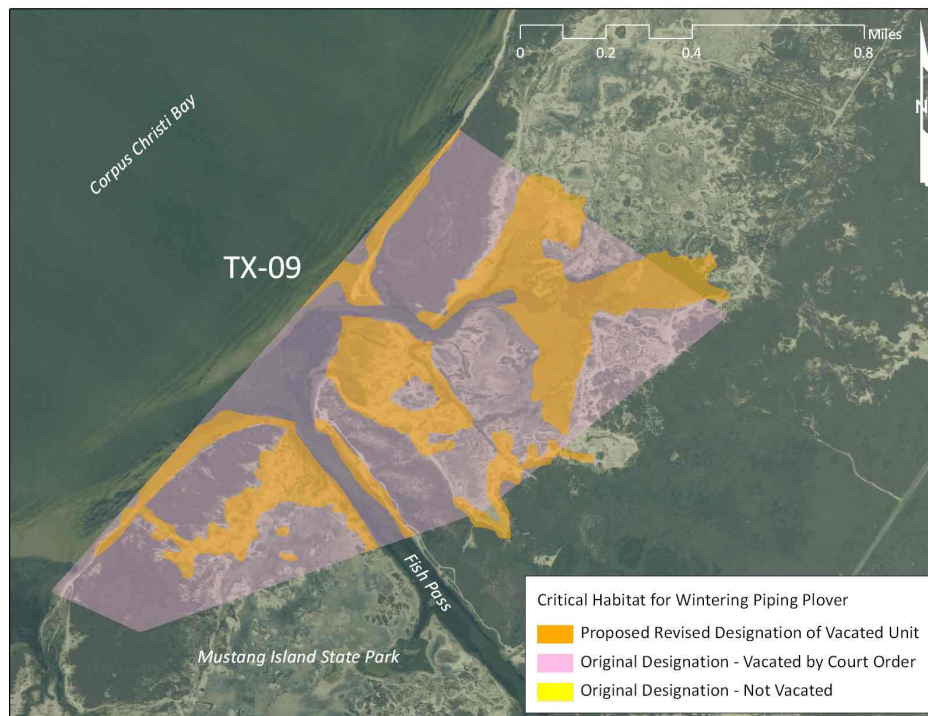


Figure 11. Piping Plover proposed revised critical habitat unit TX-9.

2.3.6 Unit TX-10 Shamrock Island and Adjacent Mustang Island Flats. This unit consists of the following three subunits.

Subunit TX-10A Shamrock Island (Figure 12). This 12-acre island in Nueces County was a peninsula extending off of Mustang Island in Corpus Christi Bay until erosion separated the island from the mainland. Five small polygons of sand flats from 1.1 to 6.8 acres comprise the subunit. Most of the land is state-owned and managed by the Texas General Land Office; the remainder is private lands (Table 3).

Subunit TX-10B Mustang Island - Unnamed Sand Flat (Figure 12). This three-acre subunit in Nueces County is a small, unnamed sand flat near the north edge of the mouth of Wilson's Cut in Corpus Christi Bay. The subunit is the western half of the island that is sand flats landward (easterly) to the western edge of tidal marsh. It is entirely state-owned (Table 3) and managed by the Texas General Land Office.

Subunit TX-10C Mustang Island - Lagoon Complex (Figure 12). This 329-acre subunit in Nueces County is an extensive lagoon complex that consists of 11 polygons within a larger polygon that extends 2.2 miles south of Wilson's Cut in Corpus Christi Bay. The subunit consists of private and state-owned lands (Table 3).

2.3.7 Unit TX-14 East Flats. This bayside unit consists of 590 acres in Nueces County. It is an irregular-shaped intertidal sand flat south of the Corpus Christi Ship Channel (Figure 13). The north boundary is the northern edge of the sand flat near or adjacent to dredge spoil areas bordering the south side of the Corpus Christi Ship Channel. On the east, it abuts the City of Port Aransas. The unit is mostly in private ownership with a small portion of state land managed by the Texas General Land Office (Table 3).

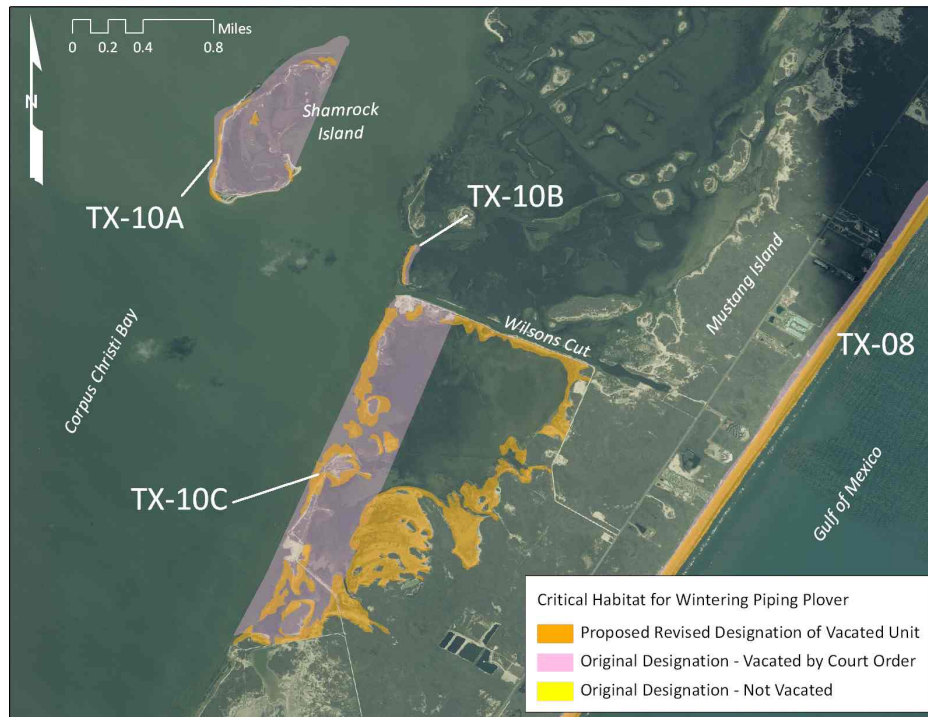


Figure 12. Piping Plover proposed revised critical habitat unit TX-10.

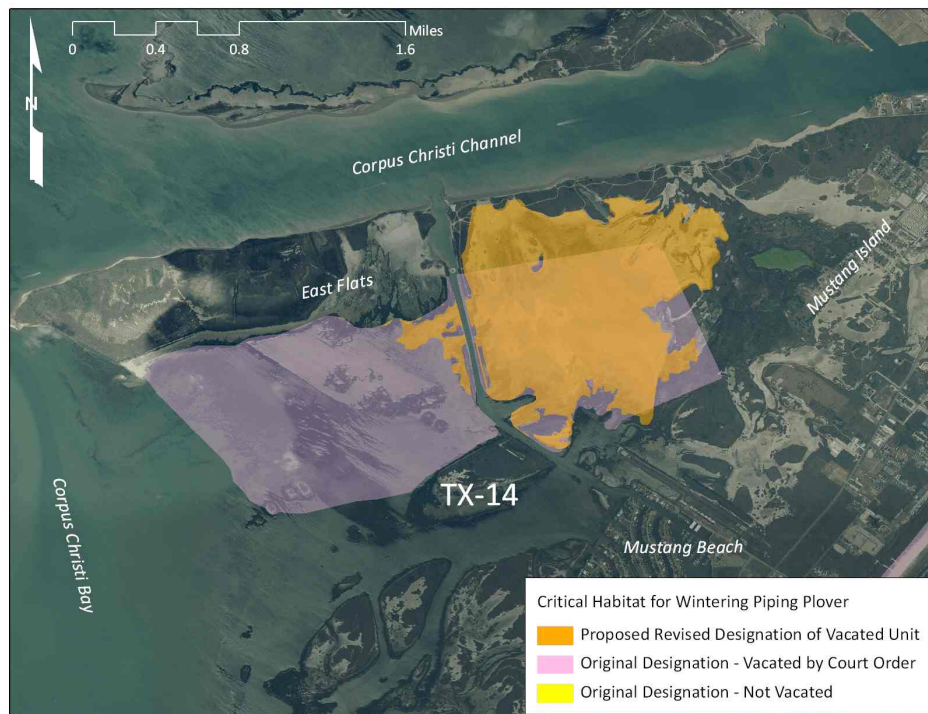


Figure 13. Piping Plover proposed revised critical habitat unit TX-14.

2.3.8 Unit TX-15 North Pass. This bayside unit consists of 805 acres in Aransas County (Figures 14 and 15). This unit is a remnant of a hurricane washover on San Jose Island. Approximately 18 percent is state-owned and managed by the Texas General Land Office; the remainder is in private ownership (Table 3).

2.3.9 Unit TX-16 San Jose Beach. This unit consists of 1,376 acres in Aransas County (Figures 14 and 15). It is a Gulf-side beach unit approximately 19.8 miles long. The southern boundary is the edge of the north jetty of Aransas Pass. The jetty is not within the boundary of the unit. The south edge of Cedar Bayou Pass is the northern boundary. The eastern boundary is the MLLW of the Gulf of Mexico, and the western boundary runs along the dune line where the habitat changes from lightly-vegetated, sandy beach to densely- vegetated dunes.

A small portion of this unit is in federal ownership and managed by the Service's Matagorda Island National Wildlife Refuge. Approximately half of the unit is state-owned and is managed by the Texas General Land Office, and nearly as much is in private ownership (Table 3).

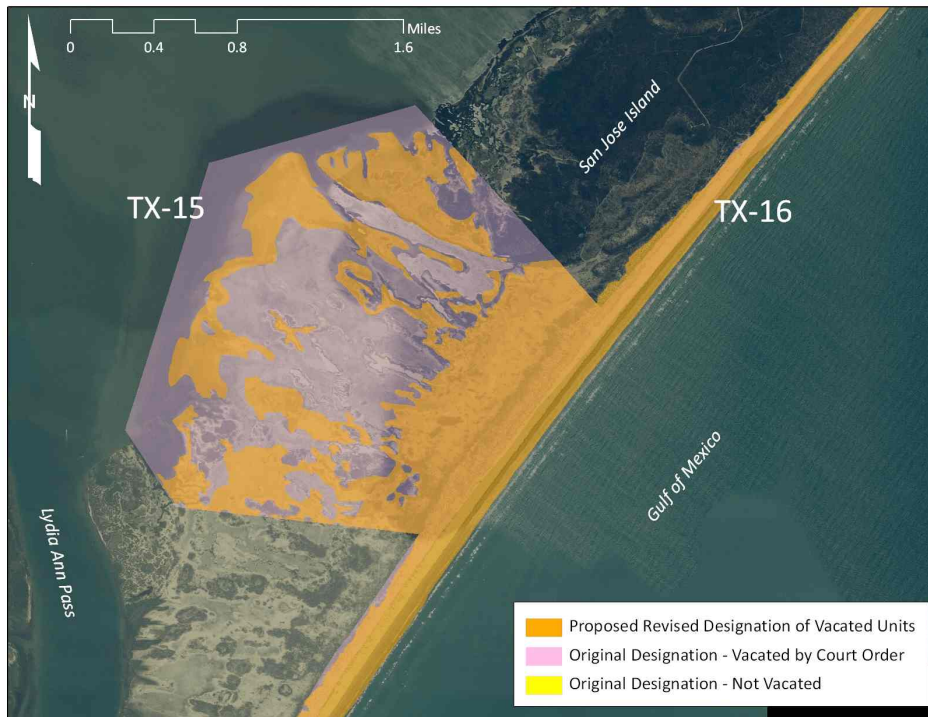


Figure 14. Piping Plover proposed revised critical habitat units TX-15 and TX-16.

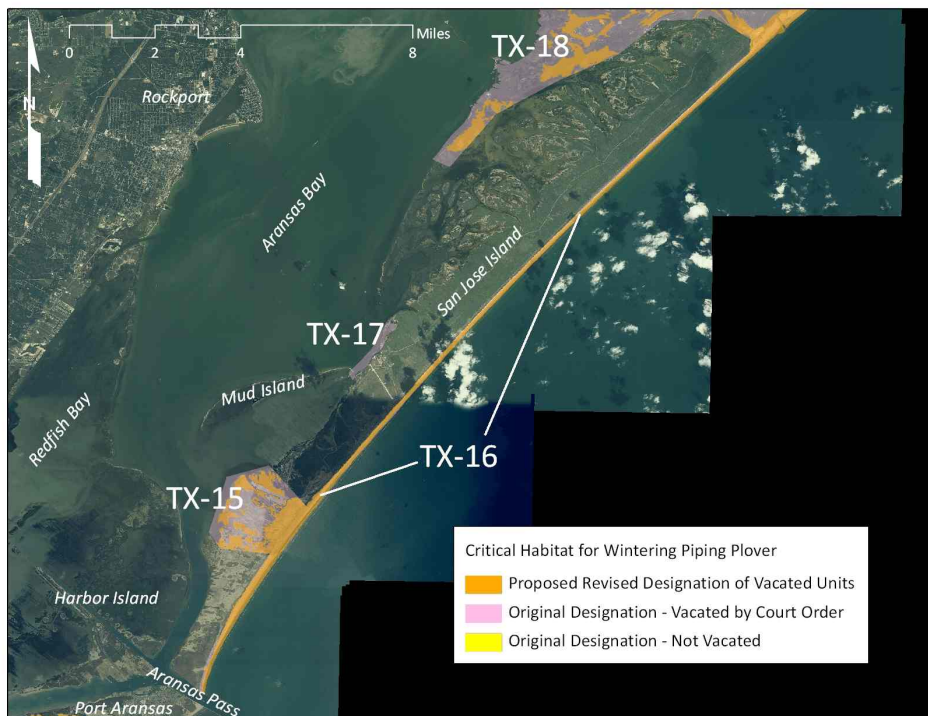


Figure 15. Piping Plover proposed revised critical habitat units TX-15 and TX-16.

2.3.10 Unit TX-18 Cedar Bayou/Vinson Slough. This bayside unit consists of 2,467 acres in Aransas County (Figure 16). It is a remnant of a hurricane washover area and includes the highly dynamic area of Cedar Bayou, the pass that separates San Jose Island and Matagorda Island. Beginning at the confluence of Vinson Slough and Cedar Bayou, the boundary follows the shore of Spalding Cove to Long Reef, then continues along a line extending 2.5 miles southwest of Long Reef to the shore of San Jose Island, then along the shore of the island to the landward boundary of Unit TX-16. The eastern boundary at the northeastern end of the unit is units TX-16 and TX-19 on the Gulf side. The western boundary is the western edge of tidal sand flats in Aransas Bay. This area includes a small portion of federally-owned land managed by the Service's Matagorda Island National Wildlife Refuge and a small section of state-owned land (Table 3). The remaining area is privately owned.

2.3.11 Unit TX-19 Matagorda Island Beach. This unit consists of 2,419 acres in Calhoun County (Figure 17). It is a Gulf-side beach unit approximately 37.1 miles long. The southern boundary is the northern edge of Cedar Bayou Pass, and the northern boundary is the southern edge of Pass Cavallo. At Pass Cavallo, the unit curves from the eastern Gulf-side passing between the south edge of the pass and the north edge of the dunes to a small area on the bayside. The eastern boundary is the MLLW of the Gulf of Mexico, and the western boundary runs along the dune line where the habitat changes from lightly-vegetated, sandy beach to densely-vegetated dunes. The federally-owned land in this unit is managed by the Service's Matagorda Island National Wildlife Refuge (Table 3). This unit also includes a small section of land in state ownership.

2.3.12 Unit TX-22 Decros Point. This unit consists of 545 acres at the Matagorda-Calhoun County line (Figure 18). It is a Gulf-side beach unit approximately 4.8 miles long. This unit was originally the southern tip of the Matagorda Peninsula. It was made into an island by the dredging of the Matagorda Ship Channel, the edge of which is the northern boundary of the unit. The unit is a horseshoe shape with the east side along the Gulf of Mexico and the west side along Matagorda Bay; the two legs are connected at their southern boundary by habitat from the north edge of Pass Cavallo northward to the dune line. The eastern boundary is the MLLW of the Gulf of Mexico, and the western boundary is the western edge of tidal sand flats on the east side of Matagorda Bay. Approximately 60 percent of the unit is in state ownership managed by the Texas General Land Office. The remainder is privately owned (Table 3).

2.3.13 Unit TX-23 West Matagorda Peninsula Beach. This unit consists of 1,808 acres of shoreline in Matagorda County (Figure 19). It is a Gulf-side beach unit approximately 23.9 miles long. The southern boundary is the northern jetty of the Matagorda Ship Channel. The northern boundary is the Old Colorado River channel. The MLLW of the Gulf of Mexico is the eastern boundary, and the western boundary runs along the dune line where the habitat changes from lightly-vegetated, sandy beach to densely-vegetated dunes. Just under half of the unit is state-owned and is managed by the Texas General Land Office; the remainder is privately owned (Table 3).

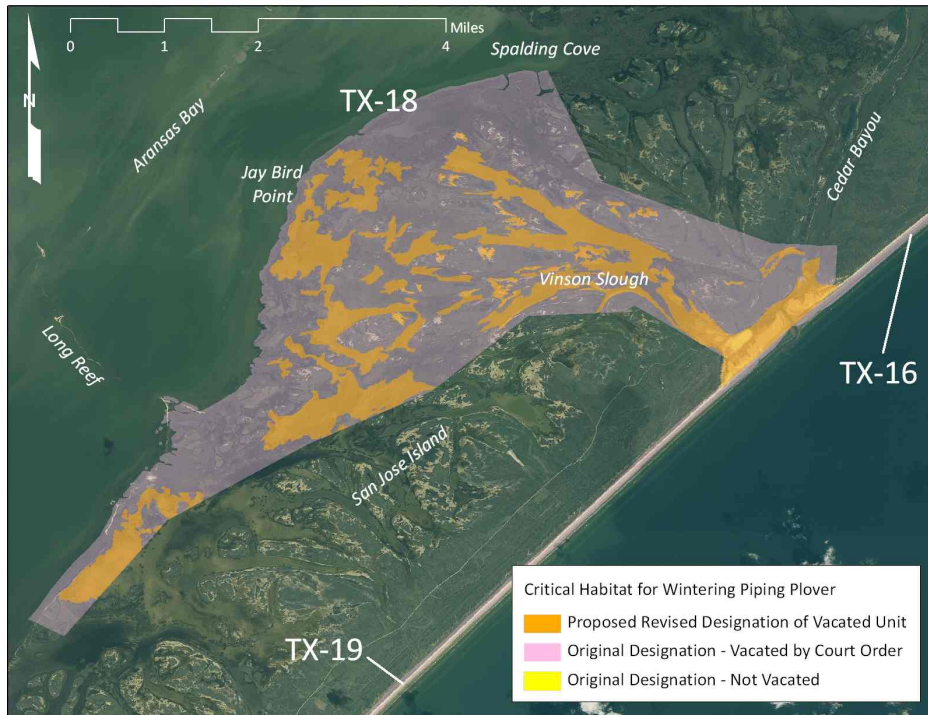


Figure 16. Piping Plover proposed revised critical habitat unit TX-18.

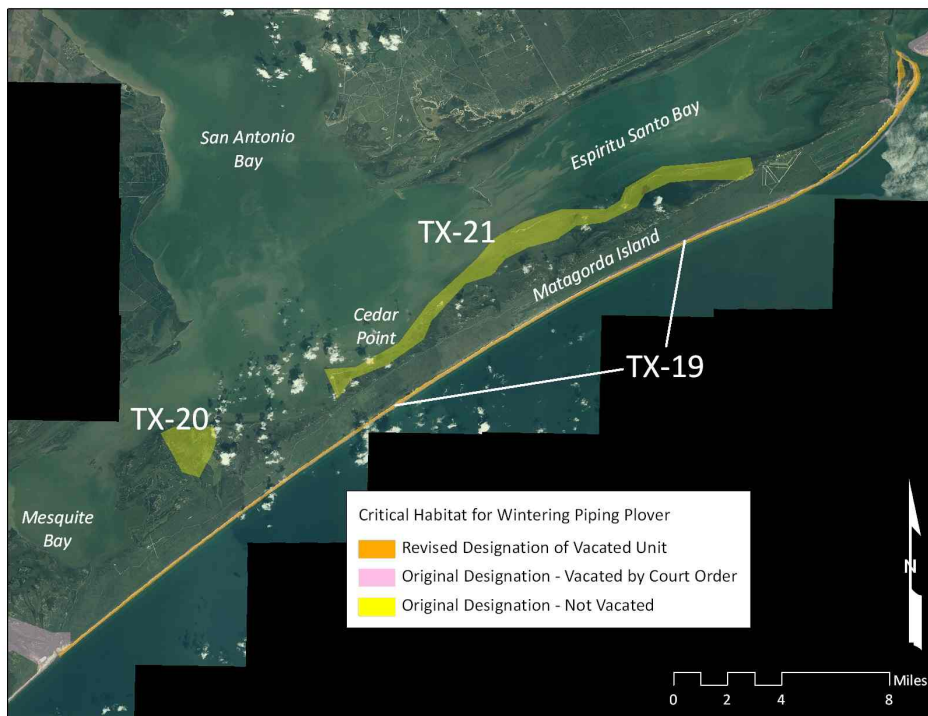


Figure 17. Piping Plover proposed revised critical habitat unit TX-19.



Figure 18. Piping Plover proposed revised critical habitat unit TX-22.

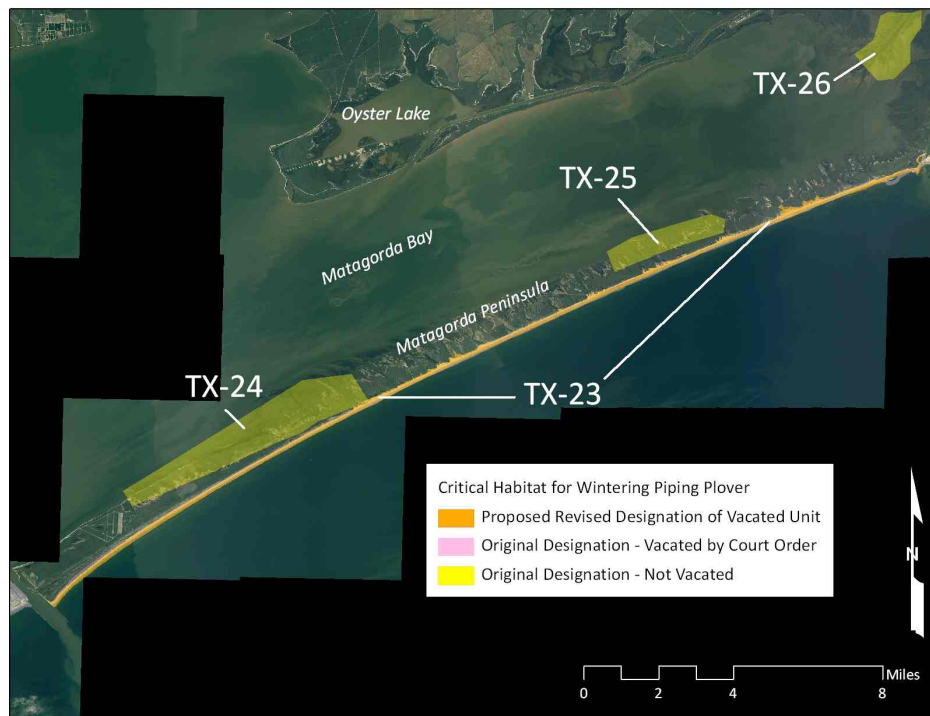


Figure 19. Piping Plover proposed revised critical habitat unit TX-23.

2.3.14 Unit TX-27 East Matagorda Bay/Matagorda Peninsula Beach West. This unit consists of 906 acres of shoreline in Matagorda County (Figure 20). It is a Gulf-side beach unit approximately 14.1 miles long. The southwestern boundary is the northeastern edge of the Old Colorado River channel. The unit runs along the beach 14 miles to the northeastern boundary opposite Eidelbach Flats. The southeastern boundary is the MLLW of the Gulf of Mexico. The northwestern boundary runs along the dune line where the habitat changes from lightly-vegetated sandy beach to densely-vegetated dunes. Just over half of the unit is state-owned and managed by the Texas General Land Office; the remainder is privately owned (Table 3).

2.3.15 Unit TX-28 East Matagorda Bay/Matagorda Peninsula Beach East. This Gulf-side unit consists of 478 acres in Matagorda County (Figure 21). It extends along the Gulf beach southwest and northeast of Brown Cedar Cut. The cut is not within the boundary of the unit. This unit abuts with portions of the southeastern edges of units TX-29 and TX-30, which are on the East Matagorda Bay side. The southwestern boundary is approximately four miles southwest of Brown Cedar Cut. The northeastern boundary is approximately 2.8 miles northeast of Brown Cedar Cut to the point where Texas Farm to Market Road 457 intersects the beach. The southeastern boundary is the MLLW of the Gulf of Mexico. The northwestern boundary runs along the dune line where the habitat changes from lightly-vegetated, sandy beach to densely-vegetated dunes. Approximately one-third is in state ownership and is managed by the Texas General Land Office; the remaining two-thirds is privately owned (Table 3).

2.3.16 Unit TX-31 San Bernard National Wildlife Refuge Beach. This Gulf-side unit consists of 399 acres in Matagorda and Brazoria

counties (Figure 22). It is a 6.2-mile segment of beach on the Gulf of Mexico near the mouth of the San Bernard River. The northeastern boundary is at the southwestern edge of the mouth of the San Bernard River. The southeastern boundary is the MLLW of the Gulf of Mexico. The northwestern boundary runs along the dune line where the habitat changes from lightly-vegetated, sandy beach to densely-vegetated dunes.

Approximately 30 percent of this unit is in federal ownership and managed by the Service's San Bernard National Wildlife Refuge (Table 3). Approximately 48 percent is state-owned and managed by the Texas General Land Office with the remaining area in private ownership.

2.3.17 Unit TX-32 Gulf Beach Between Brazos and San Bernard Rivers. This Gulf-side unit consists of 555 acres of shoreline in Brazoria County (Figure 23). This unit is a 6.1-mile segment of beach on the Gulf of Mexico between the mouths of the San Bernard and Brazos Rivers. The southwestern boundary is the northeastern edge of the mouth of the San Bernard River. The northeastern boundary is the western edge of the mouth of the Brazos River. The southeastern boundary is the MLLW of the Gulf of Mexico. The northwestern boundary runs along the dune line where the habitat changes from lightly-vegetated, sandy beach to densely-vegetated dunes. It is entirely in state ownership and is managed by the Texas General Land Office (Table 3).

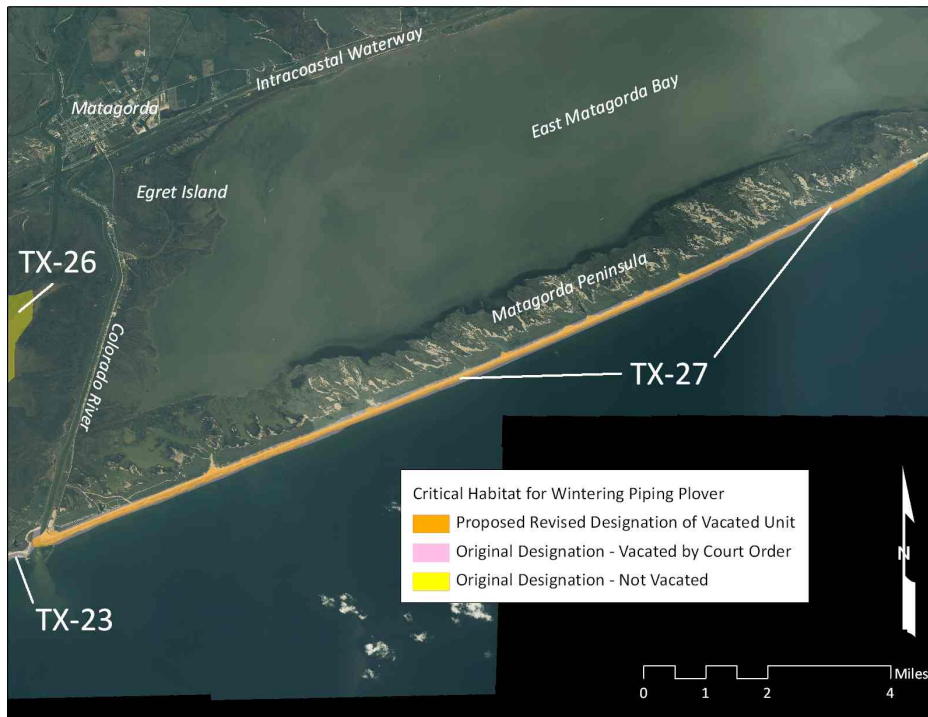


Figure 20. Piping Plover proposed revised critical habitat unit TX-27.



Figure 21. Piping Plover proposed revised critical habitat unit TX-28.

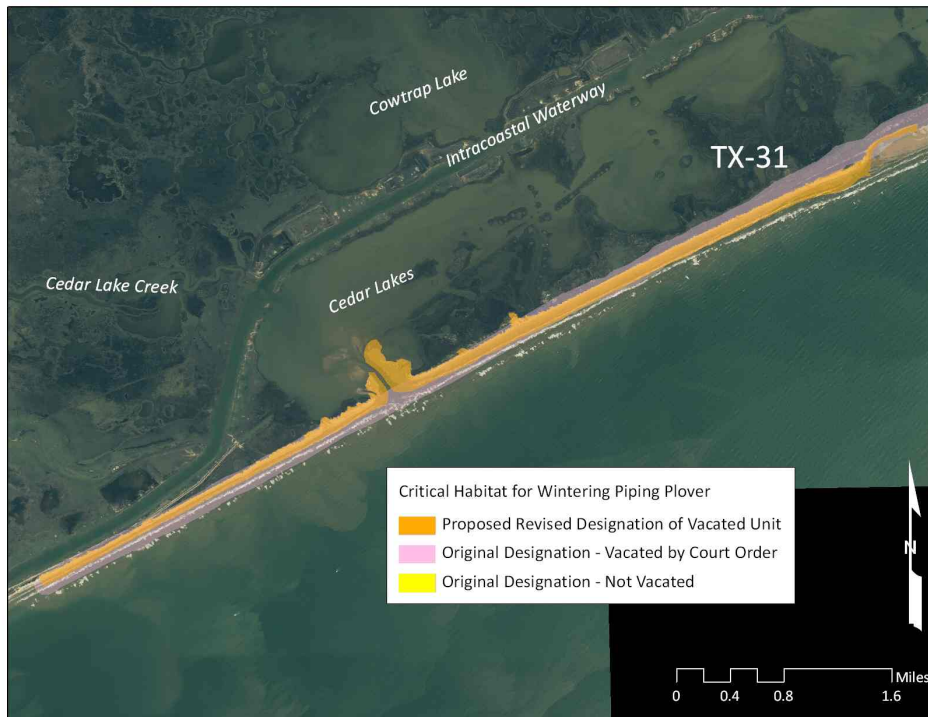


Figure 22. Piping Plover proposed revised critical habitat unit TX-31.

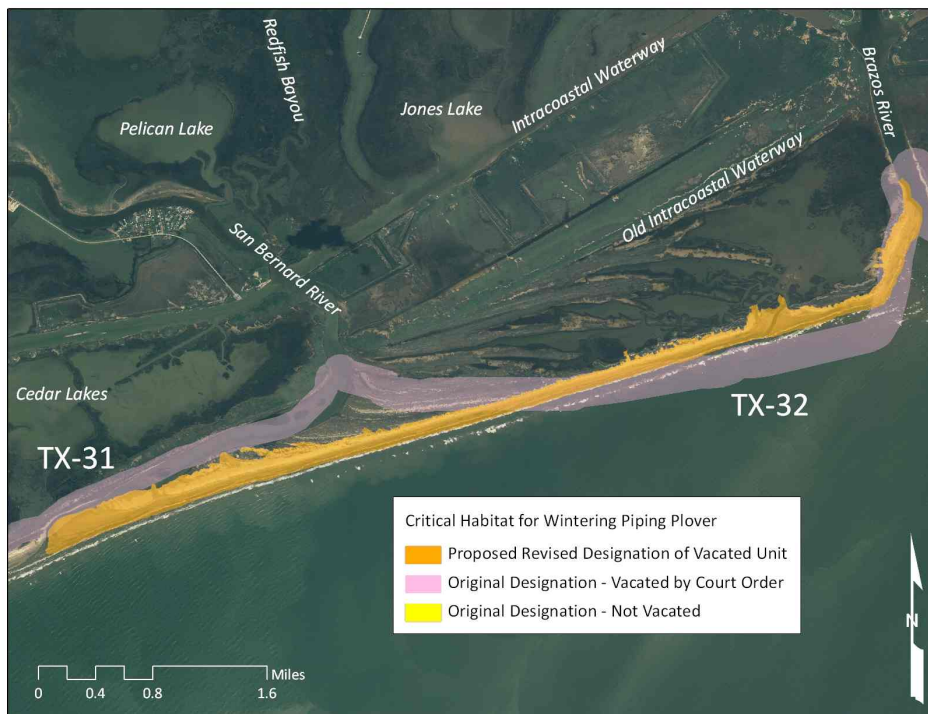


Figure 23. Piping Plover proposed revised critical habitat unit TX-32.

2.3.18 Unit TX-33 Bryan Beach and Adjacent Beach. This unit consists of 212 acres in Brazoria County (Figure 24). It is a Gulf-side beach approximately 3.5 miles in length on the Gulf of Mexico near the mouth of the Brazos River. The southwestern boundary is the northeastern edge of the Brazos River. The northeastern boundary is Farm-to-Market Road 1495 (Bryan Beach Road). The southeastern boundary is the MLLW.

The northwestern boundary follows along the dune line where the habitat changes from lightly-vegetated, sandy beach to densely-vegetated dunes. The unit is entirely in state ownership (Table 3) and is managed by the Texas Parks and Wildlife Department.

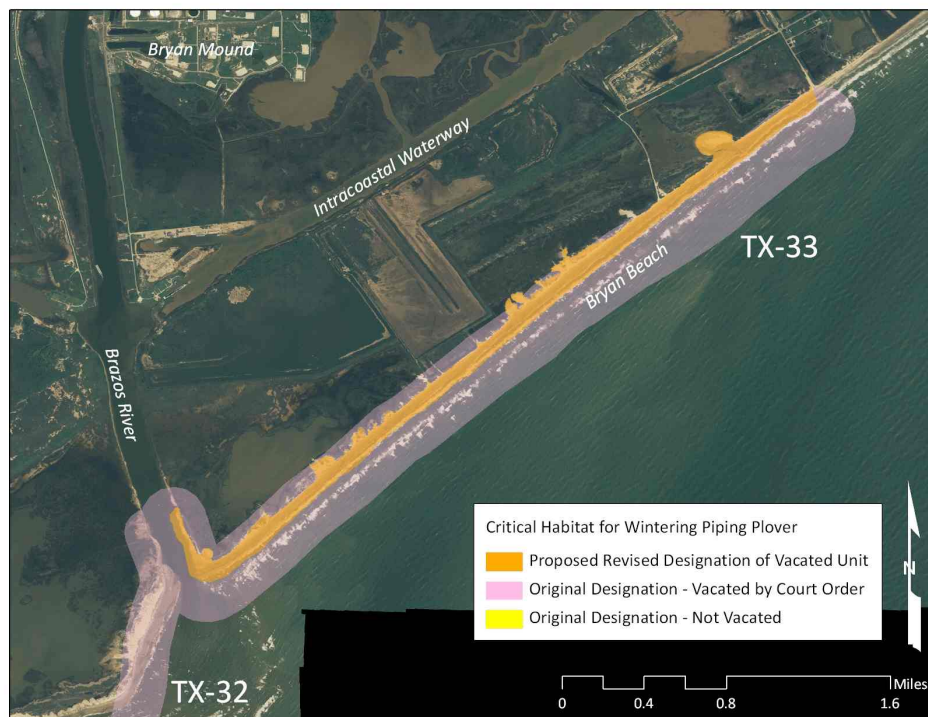


Figure 24. Piping Plover proposed revised critical habitat unit TX-33.

2.4 Comparison of Alternatives

Table 4 summarizes the potential effects or characteristics of the alternative critical habitat designations on the environment. Potential effects on resources are summarized from the analyses presented in Chapter 3.

Table 4. Comparison of potential effects of alternative critical habitat designations.

Resource Category	Alternative A - No Action	Alternative B - Proposed Action
Conservation of Wintering Piping Plover	<ul style="list-style-type: none"> - section 7 consultation under the jeopardy standard required for federal actions potentially affecting the species - section 7 consultation under the adverse modification standard required for federal actions potentially affected critical habitat in the 18 units not vacated by court order (16,303 acres) - non-regulatory benefits of critical habitat on conservation of wintering Piping Plover would occur in the 18 designated units not vacated by court order (16,303 acres) 	<ul style="list-style-type: none"> -section 7 consultation under the jeopardy standard required for federal actions potentially affecting the species - section 7 consultation under the adverse modification standard required for federal actions potentially affected critical habitat in the 18 units not vacated by court order (16,303 acres) and the 18 revised units (138,881 acres) - non-regulatory benefits of critical habitat on conservation of wintering Piping Plover would occur in the 18 designated units not vacated by court order (16,303 acres) and the 18 revised units (138,881 acres)
Beach Maintenance	<ul style="list-style-type: none"> - section 7 consultation under the jeopardy standard would be required for federal-supported beach maintenance projects - section 7 consultation under the adverse modification standard would be required for federal-supported beach maintenance activities in the 18 critical habitat units not vacated by court order. Six of the units contain beach areas. - conservation measures recommended in critical habitat may include installing information signs and avoiding extensive removal of Sargassum 	<ul style="list-style-type: none"> - section 7 consultation under the jeopardy standard would be required for federal-supported beach maintenance projects - section 7 consultation under the adverse modification standard would be required for federal-supported beach maintenance activities in the 18 critical habitat units not vacated by court order and the 18 revised units. Nine of the revised units contain beach areas. - no new conservation recommendations pertaining to critical habitat, compared to the No Action Alternative

Oil and Gas	<ul style="list-style-type: none"> - section 7 consultation under the jeopardy standard would be required for federal-supported oil and gas projects - section 7 consultation under the adverse modification standard would be required for federal-supported oil and gas activities in the 18 critical habitat units not vacated by court order - 2,595 acres of existing oil and gas leases and 104 acres of nominated lease areas within critical habitat - existing critical habitat contains one permitted well location and three existing oil and/or gas wells - conservation recommendations specific to critical habitat include not discharging fresh water across tidal flats and avoiding oil and chemical spills 	<ul style="list-style-type: none"> - section 7 consultation under the jeopardy standard would be required for federal-supported oil and gas projects - section 7 consultation under the adverse modification standard would be required for federal-supported oil and gas activities in the 18 critical habitat units not vacated by court order and the 18 revised units - 6,492 acres of oil and gas leases and 240 acres of nominated lease areas within critical habitat - revised critical habitat designation would contain four permitted well locations and 11 existing oil and/or gas wells - no new conservation recommendations pertaining to critical habitat, compared to the No Action Alternative
Waterway Facilities and Maintenance	<ul style="list-style-type: none"> - section 7 consultation under the jeopardy standard would be required for federal-supported waterway facilities and maintenance projects - section 7 consultation under the adverse modification standard would be required for federal-supported waterway facilities and maintenance activities in the 18 critical habitat units not vacated by court order - 4.06 miles of shipping channel and 746 acres of dredged material placement areas within critical habitat - conservation recommendations specific to critical habitat include not discharging fresh water across tidal flats and avoiding oil and chemical spills 	<ul style="list-style-type: none"> - section 7 consultation under the jeopardy standard would be required for federal-supported waterway facilities and maintenance projects - section 7 consultation under the adverse modification standard would be required for federal-supported waterway facilities and maintenance activities in the 18 critical habitat units not vacated by court order and the 18 revised units - 4.29 miles of shipping channel and 1,588 acres of dredged material placement areas within critical habitat - no new conservation recommendations pertaining to critical habitat, compared to the No Action Alternative

Land Development	<ul style="list-style-type: none"> - development activities with a federal nexus (e.g. Clean Water Act section 404 permit) would be subject to section 7 consultation under the jeopardy standard - development activities within designated critical habitat are unlikely to occur because critical habitat areas are frequently inundated and are unsuitable for development - measures to prevent indirect effects on critical habitat units adjacent to developing areas may be recommended, such as avoiding discharging stormwater on tidal flats and avoiding stockpiling or placement of fill on mudflats, sand flats, or algal flats 	<ul style="list-style-type: none"> - effects same as No Action Alternative, except that recommendations to avoid indirect effects to critical habitat may occur in more units
Recreation	<ul style="list-style-type: none"> - recreation activities with a federal nexus (e.g. facility construction on federal land) would be subject to section 7 consultation under the jeopardy standard - recreation activities undertaken by individuals within designated critical habitat do not trigger section 7 consultation - federal-supported construction of recreation facilities in critical habitat would be subject to section 7 consultation under the adverse modification standard - measures to prevent effects on critical habitat may be recommended, such as avoiding placement of fill on mudflats, sand flats, or algal flats 	<ul style="list-style-type: none"> - effects same as No Action Alternative, except that recommendations to avoid effects to critical habitat may occur in more units

<p>Socioeconomic Conditions and Environmental Justice</p>	<ul style="list-style-type: none"> - Conservation of wintering Piping Plover over the next 12 years estimated to cost \$9.6 to \$54 million - Potential beneficial effects to tourism industry from conservation of shorebird habitats and species diversity - No measurable detrimental effects are anticipated in regards to communities or individuals (<i>e.g.</i> loss of homes, businesses, or jobs; disruption of community services or community cohesion). No disproportionate adverse effects on low-income or minority populations. 	<ul style="list-style-type: none"> - Conservation of wintering Piping Plover over the next 12 years estimated to cost \$18 to \$109.2 million - Potential beneficial effects to tourism industry from conservation of shorebird habitats and species diversity may be slightly higher, due to increased number of critical habitat areas with focus on conservation of Piping Plover - No measurable detrimental effects from the designation of proposed revised critical habitat are anticipated in regards to communities or individuals (<i>e.g.</i> loss of homes, businesses, or jobs; disruption of community services or community cohesion). No disproportionate adverse effects on low-income or minority populations - No changes in land use or ownership would occur with designation of revised critical habitat in 18 of the 19 court-vacated units
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3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes aspects of the environment that may potentially be affected by revising the critical habitat designation for wintering Piping Plover along the Texas coast. Potential effects of revised critical habitat designation under each alternative are described for the various resource categories. Resource categories addressed in the analysis were selected based on projects that have triggered section 7 consultation in the past, issues identified during the public comment period on the proposed rule (*cf.* section 1.7), and conservation considerations for wintering Piping Plover along the Texas coast. Critical habitat designation may have effects on conservation of wintering Piping Plover and various land uses or activities that have a federal nexus (*e.g.* land uses or activities that are proposed by a federal agency, require federal permitting, or are federal funded).

3.1 Assessment of Impacts

3.1.1 Nature of Impacts from Critical Habitat Designation

Impacts on the environment from designation of critical habitat stem from the section 7 consultation requirements of the ESA (*cf.* section 1.4.1.2). Under section 7(a)(2) of the ESA, federal agencies are required to consult with the Service on actions that they fund, implement, or authorize, which may affect listed species or critical habitat (50 CFR §402). The purpose of section 7 consultation, with respect to critical habitat, is to ensure that the actions of federal agencies do not destroy or adversely modify critical habitat. Critical habitat is defined as habitat that is essential for the conservation of a listed species.

Critical habitat designation does not have any impact on the environment other than through the section 7 consultation process. Critical habitat designation alone does not establish blanket rules or restrictions on land use, nor does it automatically prohibit or modify any activity. Each proposed federal action that may potentially affect designated critical habitat is analyzed individually during the section 7 consultation process. Individuals, organizations, states, local governments, and other non-federal entities are potentially affected by the designation of critical habitat only if their actions occur on federal lands, require a federal permit, license, or other authorization, or involve federal funding.

The potential for destruction or adverse modification of critical habitat is assessed in section 7 consultation by determining the effects of the proposed action on primary constituent elements or habitat qualities that are essential to conservation of the species. These anticipated effects are then analyzed to determine how they will influence the function and conservation role of the affected critical habitat unit. This analysis in section 7 consultation provides the basis for determining the significance of anticipated effects of the proposed action on critical habitat. The threshold for destruction or adverse modification is evaluated in the context of whether or not the critical habitat would remain functional (or retain the current potential for primary constituent elements to be functionally established) to serve the intended conservation role for the species.

Critical habitat is defined in section 3(5)(A) of the ESA as those areas that are essential for conservation of the species, and the definition of conservation includes species recovery.

Conservation of wintering Piping Plover along the Texas coast requires maintaining the capacity of the habitat to support and sustain core populations of wintering birds through the non-breeding season, such that survival through the winter is high and body condition is high going into the spring migration to the breeding grounds. This is the primary conservation value of proposed critical habitat for wintering Piping Plover along the Texas coast (73 Federal Register 29294: 29310). Because recovery of the species will require increased numbers of breeding pairs (*cf.* section 1.6), wintering grounds will also need to be of sufficient distribution, quantity, and quality to accommodate not only the existing population, but also the anticipated increased population size required for recovery. However, critical habitat designation may not include all of the habitat areas necessary for recovery because the extent of those areas may not be known (73 Federal Register 29294: 29296).

The threshold for destruction or adverse modification of designated critical habitat would likely be a reduction in the quantity, quality, or distribution of habitat such that its capacity to support viable core populations of wintering Piping Plover along the Texas coast is appreciably reduced (73 Federal Register 29294: 29310). Application of the adverse modification analysis to individual critical habitat units, as opposed to the entire critical habitat designation, may be appropriate because of the site fidelity exhibited by wintering Piping Plover (Haig and Elliott-Smith, 2004).

Jeopardy and adverse modification are not equivalent standards. Section 7 analysis under the jeopardy standard considers effects to individuals or populations of the listed plant or animal species. Analyses under the jeopardy standard typically involve assessing the response of individuals or populations in terms of numbers

affected, the degree to which the individuals or populations are likely to change as the result of the action, how able the individuals or populations are to recover from the disturbance, and how long it may take the individuals or populations to recover from the disturbance (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1998: 4-29). Under the adverse modification standard, section 7 analysis focuses on the value of critical habitat for conservation of the species, as described in the preceding paragraph. Analyses under the adverse modification standard typically involve assessing the direct, indirect, and cumulative effects of an action on the primary constituent elements of designated critical habitat in terms of maintaining the conservation value of the affected habitat (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1998: 4-40).

All of the proposed revised critical habitat units are considered to be occupied by wintering Piping Plover (73 Federal Register 29294: 29311). Therefore, federal actions that may occur during the 10-month period when birds are present on the wintering grounds would likely trigger section 7 consultation under the jeopardy standard. Consequently, critical habitat designation is not likely to trigger many additional section 7 consultations.

Activities involving a federal action that may destroy or adversely modify critical habitat are those that would alter the primary constituent elements to the degree that the conservation value of critical habitat for wintering Piping Plover along the Texas coast is appreciably reduced (72 FR 14328:14339). Such activities include, but are not limited to, those that would:

- significantly and detrimentally alter the hydrology of tidal mud or sand flats;

- significantly and detrimentally alter the input of sediments and nutrients necessary for the maintenance of geomorphic and biologic processes that ensure appropriately configured and productive beach systems;
- introduce significant amounts of emergent vegetation;
- significantly and detrimentally alter the topography of a site;
- significantly and detrimentally alter water quality, which may lead to decreased biodiversity or productivity of prey organisms;
- impede natural processes that create and maintain washover passes and sparsely vegetated intertidal feeding habitats.

3.1.2 Overlap With Other Listed Species

The proposed critical habitat units may be occupied by other listed species including Brown Pelican (*Pelecanus occidentalis*, endangered and proposed for delisting), green sea turtle (*Chelonia mydas*, threatened), hawksbill sea turtle (*Eretmochelys imbricata*, endangered), Kemp's ridley sea turtle (*Lepidochelys kempii*, endangered), leatherback sea turtle (*Caretta caretta*, threatened), West Indian manatee (*Trichechus manatus*, endangered), and Whooping Crane (*Grus americana*, endangered).

Some of the conservation concerns for and habitat requirements of these listed species overlap with those of wintering Piping Plover. Consequently, habitat elements relevant to conservation of wintering Piping Plover along the Texas coast may already be considered in section 7 consultations for other listed species. This overlap of several listed species reduces the likelihood of additional conservation recommendations arising from section 7 consultations that include consideration of

designated critical habitat for wintering Piping Plover along the Texas coast.

3.1.3 Impact Assessment Method

Many projects analyzed in the context of NEPA involve a specific action with well-defined parameters, such as construction of a road across a wetland. Such a project has a specific implementation time frame and well-defined project boundary. Accordingly, potential impacts can be specifically identified and forecasted relatively accurately in terms of their intensity, extent, and duration. In contrast, critical habitat designation is a complex action with effects that may vary substantially depending on location and the resource area being considered.

The consequences of section 7 consultation on impacts to wintering Piping Plover and critical habitat may be highly variable, depending on the characteristics, context, location, duration, geographic extent, and timing of each proposed action subject to consultation. This complexity is heightened by the dynamic nature of the natural environment. Biological conditions that influence the magnitude of potential impacts may change over time and from place to place. The complexity of the effects of critical habitat designation was addressed by using past section 7 consultations that involved wintering Piping Plover along the Texas coast as a basis for the impact assessment. This record reflects the types of activities that are commonly subject to section 7 consultations involving wintering Piping Plover along the Texas coast. These consultations are summarized in the following section.

A separate analysis of the economic impacts of conservation activities for wintering Piping Plover in the court-vacated critical habitat units was conducted and relevant results were incorporated into this EA (Industrial Economics, Inc., 2008).

The economic analysis considered impacts that were "*attributable coextensively to other causes*" (New Mexico Cattle Growers Ass'n v. U.S. Fish and Wildlife Service, 248 F.3d 1277 [10th Cir. 2001]; Industrial Economics, Inc., 2007: 1-1). The portion of the economic analysis that included effects resulting from all conservation actions conducted for wintering Piping Plover in the court-vacated critical habitat units since the population was listed is referred to as the baseline. Incremental economics impacts, defined as those resulting solely from the proposed revised critical habitat designation, were also estimated in the analysis.

The time frame for the analysis in this EA corresponds to the time frame anticipated for recovery of the species. The latest date for recovery specified in recovery plans for the three breeding populations is 2020 for the Great Lakes breeding population (U.S. Fish and Wildlife Service, 2003: 46). A date of 2010 is specified for anticipated recovery of the Atlantic Coast breeding population (U.S. Fish and Wildlife Service, 1996:iv) and no date for recovery is specified for the Great Plains breeding population (U.S. Fish and Wildlife Service, 1988). Therefore, an appropriate time frame for analyzing impacts resulting from revised designation of critical habitat for wintering Piping Plover along the Texas coast is on the order of two to 12 years. After that time, according to the recovery plans, the species would be delisted and critical habitat for it would no longer be designated.

The proposed action analyzed in this EA is designation of critical habitat. Therefore, the No Action alternative is defined as no designation of revised critical habitat in the vacated units. However, wintering Piping Plover along the Texas coast would continue to be listed as threatened under the ESA, and currently designated critical

habitat (*i.e.* units designated in 2001 and not vacated in 2006) would remain in place.

3.1.4 Summary of Section 7 Consultation Case Studies

There are 493 section 7 actions in the records of the Clear Lake and Corpus Christi Ecological Services field offices, which cover the area under consideration for revised critical habitat designation for wintering Piping Plover along the Texas coast. The record of section 7 actions covers the period from 1991 through April 2008. Of the 493 section 7 actions, 118 (24 percent) were cases of technical assistance, which consisted solely of providing information on listed, proposed, and candidate species to project proponents (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1998: 3-7). Technical assistance cases were not used in the analysis in this EA because they involved providing information only. Any conservation measures developed by project proponents receiving only technical assistance from the Service were considered to be voluntary.

The remaining 375 cases in the record are section 7 consultations. The majority of the section 7 consultations in the record (368 or 98 percent) are informal. The record contains seven formal consultations involving effects to wintering Piping Plover on the Texas coast (Table 5). However, as described below, wintering Piping Plover was the subject of the formal consultation in only six of the seven cases. All of the formal consultations that involved wintering Piping Plover ended with a non-jeopardy and no adverse modification conclusions. These formal and informal consultations constitute the pool of case studies that form the basis of the analysis.

Forty-three percent (157 cases) of all informal section 7 consultations and three of the formal

consultations were in regards to land development projects (Table 5). The majority of these projects consisted of residential or commercial developments, but this category also included other developments such as landfills, water system improvements, brush clearing, and storm-water management facilities. The three formal consultations on land development projects were for construction of a marina on South Padre Island in Cameron County (consultation no. 02-11-92-F-0010), a development plan in Nueces County (consultation no. 02-11-95-F), and a commercial development in Cameron County (consultation no. 02-11-97-F-0146-R1). The federal action that triggered section 7 consultation in all three of these cases was Clean Water Act section 404 and/or Rivers and Harbors Act section 10 permitting process conducted by the U.S. Army Corps of Engineers.

Oil and gas projects comprised 16 percent of the section 7 consultations (61 cases; Table 5). All of the section 7 consultations on oil and gas projects were informal. Most of these projects were subject to section 7 consultation because of a federal Clean Water Act section 404 permitting action by the U.S. Army Corps of Engineers. However, licensing or permitting actions by the Federal Energy Regulatory Commission also triggered section 7 consultations for pipeline projects. Oil and gas projects with a federal nexus that triggered section 7 consultation included pipeline construction and repair, exploration and seismic testing, and production activities such as construction of well pads and access roads.

Waterway management projects (23 cases) contributed six percent of the section 7 consultations. Waterway management projects involved port maintenance, dredging of ship channels, and dredging or reopening of passes and included two formal consultations (Table 5). Both of the formal consultations involved proposed re-opening of the Packery Channel. The

first formal consultation, triggered by Rivers and Harbors Act section 10 and Clean Water Act section 404 permitting processes by the U.S. Army Corps of Engineers, was regarding a proposal in 1994 to re-open and maintain the Packery Channel (consultation no. 02-11-92-F-024). This project was never implemented. The second consultation was for a similar proposal that was initiated in 2000 by the U.S. Army Corps of Engineers (consultation no. 02-11-02-F-255).

Four percent of the consultations (15 cases) were on recreation-related projects (Table 5). All of these cases were informal consultations and consisted mainly of proposals to construct boat ramps, piers, docks, trails, and park facilities. Beach maintenance projects composed two percent (eight cases) of the consultation record (Table 5); four of these cases were informal consultations. Beach maintenance projects included beach nourishment, dune rehabilitation, shoreline protection, and beach cleaning. One beach maintenance project was the subject of conferencing in a formal consultation because of adverse effects on proposed critical habitat of wintering Piping Plover. This project consisted of a proposal by the City of Corpus Christi to conduct cleaning activities and driving lane maintenance along a 21-mile section of beach from Port Aransas south to Padre Island National Seashore in Nueces County (consultation no. 21410-2006-F-0265). The federal nexus triggering section 7 consultation for this project was a permitting action by the U.S. Army Corps of Engineers.

Table 5. Summary of section 7 consultations involving wintering Piping Plover along the Texas coast from 1991 through April 2008. Those resource categories that may potentially be affected by proposed revised critical habitat designation are shown in the highlighted rows. The resource categories that have not involved actions in critical habitat and are unlikely to do so in the future are shown in gray text. These resource categories are not analyzed in the EA because they are unlikely to be affected by proposed revised critical habitat designation.

PROJECT TYPE	FORMAL	INFORMAL	PERCENT OF TOTAL
Beach Maintenance	1	7	2%
Communication	0	31	8%
Conservation	0	35	9%
Land Development	3	157	43%
Military	0	3	1%
Oil and Gas	0	61	16%
Powerline	0	5	1%
Recreation	0	15	4%
Transportation	1	29	8%
Waterways	2	21	6%
Other	0	4	1%
Total	7	368	

Three categories of projects each made up eight or nine percent of the consultations: communication facilities, conservation-related projects, and transportation (Table 5). All of the section 7 consultations for communication facility projects (31 cases or nine percent) were informal and consisted mainly of construction of cell towers, installation of equipment at existing towers, and placement of buried cables.

Conservation-related projects (35 cases) made up nine percent of the total number of section 7 consultations (Table 5). All of the conservation-

related project cases were informal section 7 consultations. These projects involved actions such as water management, wetland restoration, prescribed burning, land acquisition, and conservation plan development. These projects were typically either proposed by federal agencies or involved federal permitting under the Clean Water Act.

There were 30 section 7 consultations (eight percent) in the record that involved transportation projects. Twenty-nine of the 30 section 7 consultations on transportation projects were

informal (Table 5). One of the transportation project cases was a formal consultation. This project involved improvements to a 9.7-mile segment of State Highway 48 in Cameron County (consultation no. 02-11-98-F-005). Formal consultation on this project arose from a "may affect, likely to adversely affect" determination for Gulf Coast jaguarundi (*Herpailurus yagouarundi cacomitli*). The determination for wintering Piping Plover for this project was "may affect, not likely to adversely affect." Transportation projects in the consultation record included road and bridge projects, railroad projects, and airport facility improvements.

Military projects (three cases), powerline projects (five cases), and other actions (four cases) each made up one percent of the consultation record. All of these cases were informal consultations (Table 5). None of the communication, conservation, transportation, military, powerline, or other projects were proposed in critical habitat areas. Therefore, the potential effects of critical habitat designation on these resource categories were not analyzed in this EA.

3.2 Conservation of Wintering Piping Plover Along the Texas Coast

3.2.1 Existing Conditions

Existing conditions are defined as no revised critical habitat designation for wintering Piping Plover in the 19 vacated critical habitat units. Critical habitat for wintering Piping Plover would remain in place in the 18 units that were not vacated by court order. Also, the wintering population of Piping Plover along the Texas coast would continue to be listed as threatened under the ESA.

The goal of conserving Piping Plover is to ensure its survival and to recover the species so that listing under the ESA is no longer necessary. Survival of Piping Plover means that the species continues to exist into the future with the potential for recovery, which requires that populations are sufficiently large with necessary age classes, genetic heterogeneity, and viable offspring in an environment that provides all requirements for breeding, feeding, and sheltering (U.S. Fish and Wildlife Service, 2008a). Recovery of Piping Plover will require increasing the numbers of breeding pairs in each of the three breeding populations, as described in section 1.6. Aspects of recovery that are specific to the wintering grounds include ensuring the protection and long-term maintenance of essential wintering habitat, sufficient in quantity, quality, and distribution to support and sustain the targeted numbers of breeding pairs and their offspring (U.S. Fish and Wildlife Service, 1988a: 59-62; U.S. Fish and Wildlife Service, 1996: 57-58; U.S. Fish and Wildlife Service, 2003a: 49). Protection of Piping Plover from the endangered Great Lakes breeding population on its wintering grounds may be particularly important because of the small size of that breeding population.

The time frame for recovery of Piping Plover specified in the recovery plans is in 2020 at the latest. Time frames specified in recovery plans are goals. Recovery may take longer or may occur sooner than the specified goal depending on a host of factors that cannot be accurately forecasted such as funding, shifting agency priorities, variable efficacy of recovery actions, and unexpected changes in species status. The recovery plan for the Great Plains breeding population is the oldest plan and does not specify a time frame (U.S. Fish and Wildlife Service, 1988). The recovery plan for the Atlantic coast breeding population states that full recovery is anticipated by 2010 (U.S. Fish and Wildlife Service, 1996: iv). The most recently developed

recovery plan, for the Great Lakes breeding population, specifies an objective of removing the species from the list of threatened and endangered species by 2020 (U.S. Fish and Wildlife Service, 2003: 464).

Major threats to wintering Piping Plover that were identified at the time of listing include destruction or modification of beach and littoral habitat and human disturbance (50 Federal Register 50726: 50731-50732). Human-caused disturbance factors that may affect survival of Piping Plover or utilization of wintering habitat include recreational activities, inlet and shoreline stabilization projects, dredging of inlets that can affect spit formation, beach maintenance and renourishment, and pollution. In some areas, natural erosion of barrier islands may also result in habitat loss. The construction of houses and commercial buildings on and adjacent to barrier beaches directly removes habitat of Piping Plover and results in increased human disturbance. The impacts of shoreline development are often greatly expanded by the attendant concerns for protecting access roads (U.S. Fish and Wildlife Service, 2008a: 19).

3.2.1.1 State of Texas Laws and Programs

Texas state law specifies that no person may "take, possess, propagate, transport, export, sell or offer for sale any species of fish or wildlife listed by the department as threatened" unless that person has a valid out-of-state permit, bill of sale, or notarized affidavit indicating that the specimen was legally obtained (31 Texas Administrative Code §65.171) or has a letter of authorization from the Texas Parks and Wildlife Department (31 Texas Administrative Code §65.173). Texas Parks and Wildlife regulations do not contain any provisions for protection of habitat of listed species. However, the Texas Coastal Management Program does include relatively broad provisions for management and protection

of coastal natural resource areas (31 Texas Administrative Code §501.1).

One of the ten goals of the Texas Coastal Management Program is "to protect, preserve, restore, and enhance the diversity, quality, quantity, functions, and values of coastal natural resource areas (CNRAs)" (31 Texas Administrative Code §501.12). Of the fourteen CRNAs, several are habitats used by wintering Piping Plover along the Texas coast, including:

- waters under tidal influence;
- tidal sand and mud flats;
- coastal shore areas;
- Gulf beaches; and
- coastal preserves.

The Coastal Coordination Council implements the Texas Coastal Management Program by ensuring that state actions, subdivision actions, and general plans are consistent with the program goals and policies. Policies have been developed regarding a wide variety of coastal activities such as oil and gas exploration and production (§501.16), development in critical areas (§501.23), construction on submerged lands (§501.24), dredging and dredged material placement (§501.25), construction in the beach/dune system (§501.26), development within coastal barrier resource system units and otherwise protected areas on coastal barriers (§501.28), and others. These policies typically require minimizing adverse impacts, compensatory mitigation for unavoidable impacts, and avoiding significant degradation of resources. For example, the policy for development in critical areas prohibits authorization of actions that would result in significant degradation of area attributes including ecosystem diversity, productivity, and fish and wildlife habitat (31 Texas Administrative Code §501.23.7).

The Texas General Land Office serves as the lead coastal agency for the purpose of receiving and administering federal Coastal Zone Management Act funds from the National Oceanic and Atmospheric Administration, which are then used to fund grants under the Texas Coastal Management Program. The Texas General Land Office also monitors the implementation of coastal policies by agencies and local governments. Types of projects that have been funded through this program that may potentially benefit conservation of wintering Piping Plover and other wildlife using coastal habitats include: water quality assessment and implementation of water quality improvements; land acquisition; wetland restoration; studies and monitoring programs; and habitat mapping.

3.2.1.2 Section 7 of the Endangered Species Act

With respect to designated critical habitat for wintering Piping Plover along the Texas coast, the existing condition consists of critical habitat designated in 18 units (units 1, 2, 5, 6, 1, 12, 13, 20, 21, 24, 25, 26, 29, 30, 34, 35, 36, and 37). The 19 units vacated by court order are currently not designated as critical habitat (*i.e.* units 3, 4, 7, 8, 9, 10, 14, 15, 16, 17, 18, 19, 22, 23, 27, 28, 31, 32, and 33). The breeding populations of Piping Plover were listed as endangered (Great Lakes breeding population) or threatened (northern Great Plains and Atlantic Coast breeding populations) in 1985 (50 Federal Register 50726). The wintering population of Piping Plover was listed as threatened under the ESA on 11 December 1985 (50 Federal Register 50726).

Federal agencies must ensure that their actions do not jeopardize the continued existence of a listed species or destroy or adversely modify designated critical habitat (ESA §7[a][2]). Under existing conditions, defined as the species being listed without any designated critical habitat in the vacated units, a federal action agency makes the initial determination of whether or not their action

would affect wintering Piping Plover. If the action agency determines that there would be no effect on the species, they are not required to consult with the Service. Section 7 consultation is triggered when it is determined that the proposed federal action under consideration has the potential to affect Piping Plover. "Take" of listed species is prohibited (ESA §9[a][1][B]) unless it is incidental to, and not the purpose of, carrying out an otherwise lawful activity and is permitted by the Secretary of the Interior (ESA §10[a][1][B]).

The standard for jeopardy is an action that, either directly or indirectly, would reasonably be expected to appreciably reduce the likelihood of the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of the species. The jeopardy analysis considers the current status of the listed species, the environmental baseline, all of the effects of the proposed action, and the cumulative effects of other anticipated actions. Section 7 consultation with the Service under the jeopardy standard is triggered when a proposed federal action is likely to affect wintering Piping Plover.

Federal actions triggering section 7 consultation under the jeopardy standard may include actions that directly or indirectly affect occupied habitat to the extent that it harms individuals (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1998: 4-44). For example, removal of wintering habitat at a site that is used year after year by wintering Piping Plover, which exhibit fidelity to wintering grounds (Nicholls and Baldassarre, 1990; Haig and Elliott-Smith, 2004), may significantly impair feeding and roosting and thus may constitute "take" of the species (*cf.* 50 Code of Federal Regulations §17.3). The requirement for section 7 consultation under the jeopardy standard has been in effect since the wintering populations of Piping Plover were listed

on 11 December 1985 (50 Federal Register 50726).

As described in section 3.1.4, there have been 375 section 7 consultations that included wintering Piping Plover since it was listed. The overwhelming majority of these consultations were informal (99 percent), meaning that the projects did not have adverse effects on wintering Piping Plover. This indicates that either: 1) federal-supported projects were designed and implemented by project proponents in a manner that avoided adverse effects; or 2) informal section 7 consultations were effective in causing federal-supported projects to be modified or implemented in a manner that resulted in avoidance of adverse effects to the species. In actuality, the preponderance of section 7 informal consultations in the record is likely a result of a combination of these two factors. In any event, the record suggests that section 7 consultations have been an effective means for conservation of wintering Piping Plover along the Texas coast in the course of development and implementation of federal-supported projects that have undergone consultation. However, non-federal actions and federal actions that have not been consulted on may cause substantial impacts to wintering Piping Plover (*e.g.* high levels of human use on beach areas used by wintering Piping Plover).

There are only six formal section 7 consultations in the consultation record for wintering Piping Plover (Table 6). That is, only six of the 376 consultations (one percent) since the wintering population was listed in 1985 have involved federal-supported actions that were likely to adversely affect Piping Plover. Only five of the consultations were completed; the Packery Channel dredging project proposed in 1992 was dropped during the planning stage. None of these formal section 7 consultations resulted in a jeopardy opinion or a destruction or adverse

modification of critical habitat opinion (Table 6).

The first two completed formal consultations involved land development projects. The first, completed in 1992 (consultation no. 21410-1992-F-0010), involved construction of a marina in the Laguna Madre at South Padre Island (Table 6). This project triggered section 7 consultation because it required a federal Clean Water Act section 404 permit from the U.S. Army Corps of Engineers. The project involved filling of tidal sand and mud flat habitat that was used by wintering Piping Plover. The second completed formal consultation, in 1995, involved a Clean Water Act section 404 permit application for a development plan for an area south of Packery Channel (consultation no. 21410-1995-F-0031). The plan was not implemented and to date no development has occurred at the site (P. Clements, U.S. Fish and Wildlife Service, Corpus Christi Ecological Services Field Office, pers. comm., 17 October 2008).

The Packery Channel dredging and restoration project (consultation no. 21410-2002-F-0255) was an action proposed by the U.S. Army Corps of Engineers, in partnership with the City of Corpus Christi. Due to federal involvement and funding by the U.S. Army Corps of Engineers, section 7 consultation was required. This project involved construction and re-opening Packery Channel. Incidental take of wintering Piping Plover was anticipated based on expected permanent loss of 8.3 acres of beach habitat. Also, incidental take was expected to result from temporary impacts to another 57.3 acres of foraging and roosting habitat about every two years due to recurring sediment disposal and beach nourishment activities.

Table 6. Summary of formal section 7 consultations involving Piping Plover. Critical habitat units where projects were located are shown by their unit number. Those marked with an asterisk indicate that critical habitat was not yet designated when these projects underwent section 7 consultation.

Year	Consultation No.	Project	Critical Habitat Unit	Effects
1992	21410-1992-F-0010	Marina Construction, 404 Permit	TX-2*	No Jeopardy
1992	21410-1992-F-0024	Packery Channel Dredging	TX-6*	Project not implemented
1995	21410-1995-F-0031	Development Plan, 404 Permit	None	No Jeopardy
2002	21410-2002-F-0255	Packery Channel Dredging & Restoration	TX-7	No Jeopardy, No Destruction or Adverse Modification of CH
2005	21410-1997-F-0146R1	Retail Center and Restaurant Development, 404 Permit	TX-2	No Jeopardy, No Destruction or Adverse Modification of CH
2008	21410-2006-F-0265	Beach Maintenance, 404 Permit	TX-3D, TX-7, TX-8	No Destruction or Adverse Modification of Proposed CH

The project was expected to cause permanent impacts to 2.1 acres of critical habitat and temporary disturbance to another 31.6 acres of critical habitat caused by construction activities. Incidental take caused by the project consisted of the following (U.S. Fish and Wildlife Service, 2003b).

"1. Harassing, disturbing, or interfering with Piping Plovers attempting to migrate, forage rest, or roost within the project area or on adjacent beaches as a result of construction activities and subsequent maintenance activities; sand placement; and increased recreational, pedestrian, or animal traffic.

2. Behavior modification of Piping Plovers during the migrating and wintering seasons due to disturbances associated with construction activities and subsequent

maintenance activities within the project area, resulting in excessive energy expenditures, displacement of individual birds, increased foraging behavior, or situations where they choose marginal or unsuitable resting or foraging areas.

3. Decreased survivorship of migrating and wintering Piping Plovers due to diminished quantity and quality of foraging habitats at the newly created inlet, compared with flood tidal deltas at naturally functioning and migrating inlets.

4. Modification of the hydrology, beach slope, and habitats utilized for feeding and roosting by the plovers."

The retail center and restaurant project was initiated in 1997 (consultation no. 21410-1997-F-

0146R1) and involved placement of fill in 2.66 acres of waters of the United States. Therefore, the project required a Clean Water Act section 404 permit from the U.S. Army Corps of Engineers, which was the federal action that triggered section 7 consultation. Incidental take resulting from the action included the following (U.S. Fish and Wildlife Service, 2005):

"... harassment in the form of disturbing or interfering with plovers attempting to forage within or adjacent to the construction area or on adjacent beaches or flats as a result of construction activities, energy depletion caused by the birds being repeatedly disturbed by construction activities, disrupted foraging behavior, and perhaps displacement to marginal or unsuitable resting or foraging areas. The construction activities will cause 2.86 acres of designated critical habitat to be lost and may diminish the quantity and quality of intertidal foraging habitats within the action area (the northern portion of CHU TX-2)."

The last formal consultation, completed in 2008, involved a Clean Water Act section 404 and Rivers and Harbors Act section 10 permit applications for beach maintenance activities along a 21-mile stretch of beach from Port Aransas south to the northern boundary of Padre Island National Seashore (consultation no. 21410-2006-F-0265). The project involved removal of non-natural material and maintenance of driving lanes by repositioning sand, grading, and removing beach wrack³ accumulated in the driving lanes. A conference opinion was prepared regarding critical habitat because the units

involved are currently proposed for designation. The conference opinion concluded that the project was not likely to significantly destroy or adversely modify proposed critical habitat for the following reasons (U.S. Fish and Wildlife Service, 2008: 37):

"Continued beach maintenance within these three proposed (critical habitat) units may reduce the suitability of the habitat for wintering Piping Plover. The total of 895 acres (362 hectares) or 18.04 miles (29 kilometers) being disturbed within the proposed action area represents about 0.37 percent of the total designated and proposed critical habitat ... Considering the effects of beach maintenance activities being authorized by the issuance of PN 24192 on the three proposed units together with the effects on the other 134 [nationwide] previously designated or proposed units, the overall effect on proposed and designated Piping Plover wintering habitat is expected to be minimal" [bracket added].

Because there are no ESA section 9 prohibitions for critical habitat, there was not an incidental take statement, reasonable and prudent measures, or terms and conditions for impacts to critical habitat. One conservation recommendation pertaining to both sea turtles and wintering Piping Plover was described in the opinion. That measure involved the recommendation to design and fund a research program to assess the long-term effects of beach maintenance activities on sea turtle nesting success and Piping Plover roosting and foraging areas (U.S. Fish and Wildlife Service, 2008b: 42).

While the analyses of effects in the formal consultations summarized above do describe impacts specifically to primary constituent elements of designated critical habitat, they also demonstrate the relationship between those

³ Beach wrack refers to lines of debris washed up on the beach consisting mainly of seaweed, terrestrial vegetation, and animal remains. See also Figure 37 in the Appendix.

impacts to habitat and effects to the species under the jeopardy standard. For example, in the incidental take discussion for the Packery Channel project, bullet number three describes a habitat impact that is anticipated to result in decreased survivorship of migrating and wintering Piping Plover.

Informal section 7 consultations have typically not interjected discretionary conservation measures solely due to the presence of designated critical habitat for wintering Piping Plover. This situation is the result of two main factors. The first is that impacts to habitat that may indirectly affect the species, such as the example described above, are considered in the jeopardy analysis. Secondly, habitat concerns for nesting sea turtles often subsume habitat issues for wintering Piping Plover (C. Yeargan, U.S. Fish and Wildlife Service, Clear Lake Ecological Service Field Office, pers. comm., 15 October 2008). For example, filling and smoothing over tire ruts is recommended for federal-sponsored actions that require heavy equipment operation in coastal habitats. This conservation measure is required primarily to reduce the incidence of trapping turtle hatchlings, but it also benefits Piping Plover.

Critical habitat designation may, however, change a consultation from informal to formal, depending on the nature of impacts to primary constituent elements. This situation occurred in the beach maintenance consultation where an adverse effect determination for Piping Plover proposed critical habitat was made, but under the jeopardy standard the determination was "may affect, but is not likely to adversely affect."

3.2.1.3 Designated Critical Habitat Critical habitat would remain in effect in 18 of the 37 units originally designated in 2001. In general, critical habitat designation provides a regulatory mechanism, through section 7 consultation, to evaluate the effects of proposed actions on

primary constituent elements within areas that are determined to be essential to the conservation of the species. The prohibition against destruction or adverse modification of critical habitat can help to ensure that the habitat continues to fully contribute to recovery of a listed species. Therefore, the critical habitat adverse modification analysis may potentially be more sensitive to the recovery needs of a species, whereas the jeopardy analysis addresses the extinction end of the conservation continuum (*cf.* 57 FR 1796: 1822). However, as discussed in section 3.2.1.2, critical habitat designation does not appear to have interjected substantial, additional conservation recommendations or requirements above and beyond those resulting from the jeopardy analysis.

Critical habitat designation does help to clarify the habitat attributes that are needed for conservation of a species, which makes it easier for project proponents to assess the potential impacts of their actions and proactively plan to avoid or otherwise minimize impacts. Other non-regulatory features of critical habitat that may benefit conservation of wintering Piping Plover include informing the public and private sector of areas that are important for species survival and recovery, focusing attention on specific geographic areas that are essential to conservation of the species, identifying areas that may require special management considerations or protection, and providing protection to areas where significant threats to the species have been identified to help avoid accidental damage to such areas.

The acreage of unvegetated bayside intertidal habitats along the Texas coast decreased by about 13 percent between 1955 and 1992 (Moulton *et al.*, 1997). These habitats, which include important wintering grounds for Piping Plover such as mud and sand flats, algal flats, beaches, and sand bars, decreased from 236,414 acres in 1955 to 205,972 acres in 1992, for a net loss of

30,442 acres. Most of this habitat loss (15,805 acres or 52 percent) was the result of conversion to upland habitat caused by placement of fill for disposal of dredged material, construction of roads, and levees (Moulton *et al.*, 1997). Conversion to estuarine emergent vegetation communities accounted for another 47 percent (14,376 acres), while rural development and conversion to palustrine (*i.e.* freshwater) emergent vegetation accounted for the remainder (Moulton *et al.*, 1997). The acreage of marine intertidal habitat (*i.e.* Gulf-side beaches, bars, and flats) did not change markedly between 1955 and 1992. Loss of bayside intertidal habitats slowed following implementation of laws to protect and conserve coastal wetlands, but loss is still occurring (Moulton *et al.*, 1997).

Habitat of wintering Piping Plover along the Texas coast is dynamic, often shifting spatially and changing in habitat characteristics over time. Large-scale factors such as hurricanes, tropical storms, and changing sea level brought about by climate change may cause substantial changes in the spatial arrangement of suitable habitat patches along the Texas coast. The rate of sea level rise has increased between the mid-19th and mid-20th centuries, and this is projected to continue into the future (Bindoff *et al.*, 2007). The Gulf coast of the United States, particularly the Texas coast, is expected to experience some of the highest rates of sea level rise (Scavia *et al.*, 2002). Additionally, current models predict that hurricanes and tropical storms will increase in frequency and intensity (Knutson *et al.*, 1998; Scavia *et al.*, 2002). Consequently, designation of critical habitat may not include all of the habitat areas that may eventually be necessary for recovery of the species. Because of this dynamic nature of habitat along the coast, critical habitat designation does not signal that habitat outside the designated area is unimportant now or may not be required for recovery of the species in the future.

3.2.1.4 Other Conservation Actions on Wintering Grounds The main conservation action outside of protective measures implemented through state or federal regulation during project development and implementation has been preservation of important habitat areas on Piping Plover wintering grounds. In 1992, a Western Hemisphere Shorebird Reserve Network site was established at Bolivar Flats. Preserves were established at Big Reef in 1995 and at San Luis Pass. The Mollie Beattie Coastal Habitat Community, located adjacent to the Packery Channel, was set aside in 1996 through the Texas General Land Office Adopt-a-Habitat Program. The Service acquired a parcel of land containing habitat for wintering Piping Plover at South Bay in 1998. Finally, the Service's Coastal Program targets restoration activities along coastal habitats and barrier islands that may indirectly benefit Piping Plover. Habitat for wintering Piping Plover is also protected in national wildlife refuges including San Bernard, Matagorda Island, Aransas, Laguna Atascosa, and Lower Rio Grande Valley as well as at Padre Island National Seashore, which is administered by the National Park Service.

3.2.2 Effects on Conservation of Wintering Piping Plover Along the Texas Coast

3.2.2.1 Alternative A - No Action Under the No Action Alternative, no critical habitat would be designated in the 19 court-vacated units (*i.e.* units 3, 4, 7, 8, 9, 10, 14, 15, 16, 17, 18, 19, 22, 23, 27, 28, 31, 32, and 33). Critical habitat would continue to be designated in the remaining 18 units that were not vacated by court order (*i.e.* units 1, 2, 5, 6, 11, 12, 13, 20, 21, 24, 25, 26, 29, 30, 34, 35, 36, and 37). Wintering Piping Plover along the Texas coast would continue to be listed as threatened under the ESA. Therefore, wherever the species is found, ESA section 7

consultation would be triggered under the jeopardy standard for federal-supported actions (*i.e.* actions that are federally permitted, authorized, funded, or sponsored in whole or in part). All of the court-vacated critical habitat units are considered to be occupied by the species and, therefore, would be subject to section 7 consultation under the jeopardy standard even in the absence of critical habitat designation.

Under the No Action Alternative, no section 7 consultation analysis would be conducted under the destruction or adverse modification standard in the 19 court-vacated units. Thus, the regulatory benefit to conservation of wintering Piping Plover from critical habitat designation in these units would not be realized in the court-vacated units. However, section 7 analyses under the jeopardy standard appear to be incorporating important habitat issues for wintering Piping Plover, such as impacts to food resources, available foraging habitat, and roosting areas. On the other hand, critical habitat designation may elevate the importance of conserving habitat features required by wintering Piping Plover through moving section 7 consultations from informal to formal, or by focusing analysis on specific habitat features identified as primary constituent elements. Non-regulatory aspects of critical habitat designation that would contribute to conservation of wintering Piping Plover, described in section 3.2.1.3, may also not be realized with the No Action Alternative.

3.2.2.2 Alternative B - Proposed Action With selection of Alternative B, critical habitat for wintering Piping Plover along the Texas coast would consist of the 18 units that were not vacated by court order as well as 18 of the 19 units that were vacated by the order and would be revised as described in section 2.3. This would have the effect of requiring section 7 consultation when proposed federal actions may affect primary constituent elements in all designated critical

habitat units. Section 7 consultation on potential effects to primary constituent elements associated with actions on private lands would occur only when a federal action, such as funding or permitting, is involved.

Critical habitat designation would require evaluation of the effects of proposed actions on primary constituent elements within areas that are essential to the conservation of the species, even off-site federal actions that may indirectly affect primary constituent elements in the critical habitat units described for Alternative B (Table 1). For example, placement of dredged materials in the Laguna Madre, outside of a designated critical habitat unit, could potentially alter tidal regimes in a critical habitat unit on mainland mud flats (*e.g.* Drake, 1999a: 20), such as at units TX-3E or TX-4. Prohibition of destruction or adverse modification of critical habitat would be in effect and would help to ensure that essential habitat continues to fully contribute to survival and recovery of wintering Piping Plover along the Texas coast.

The non-regulatory aspects of critical habitat designation that would contribute to conservation of wintering Piping Plover along the Texas coast may be realized with implementation of Alternative B. These benefits may include informing the public and private sector of areas that are important for species recovery and where conservation actions may be most effective. Critical habitat designation focuses attention to and awareness of specific geographic areas that are essential to conservation of Piping Plover. Critical habitat also identifies areas that may require special management considerations or protection, and may help provide protection to areas where significant threats to Piping Plover have been identified to help to avoid accidental damage to such areas. For instance, when a federal agency proposes an action with the knowledge that the action is located within the

boundaries of a critical habitat unit or is off-site and may indirectly affect primary constituent elements of proposed critical habitat, they can plan their projects in a proactive fashion consistent with section 7(a)(1) of the ESA.

3.3 Beach Maintenance

3.3.1 Existing Conditions

The Texas General Land Office is responsible for management of the Texas coast line from the vegetation line on the beach to 10.3 miles into the Gulf of Mexico. Areas landward of the beach vegetation line may be privately owned but are subject to the public beach easement, which allows free and unrestricted public access to beaches. The Coastal Erosion Planning and Response Act (33 Texas Administrative Code §601 through §612) authorizes the Texas General Land Office to implement a program of coastal erosion avoidance, remediation, and planning. Grant money is available to communities annually from the Texas General Land Office through the Texas Coastal Management Program and its Coastal Coordination Council for coastal projects.

3.3.1.1 Beach Maintenance Activities Within Critical Habitat Beach maintenance activities are conducted along the Gulf-side beaches of the mainland and barrier islands and consist mainly of beach nourishment (*i.e.* adding sand to eroding beach areas), shoreline protection, dune stabilization, and cleaning and debris removal.

Beach nourishment is an activity intended to replenish sand and rebuild eroding beaches. Beach erosion along the Gulf coast in Texas is a long-term geologic process and averages about five or six feet per year (Anderson and Wellner, 2002; Morton *et al.*, 2004: 32). Beach erosion has accelerated at various locations along the Texas coast due to interruption of downdrift sand

migration along the shore through construction of jetties and deep channels, reduction of sand input from rivers that empty into the Gulf, dune destabilization, and land subsidence caused by pumping of groundwater (*e.g.* Gibeaut *et al.*, 2001; Watson, 2003; Morton *et al.*, 2004). High winds during hurricanes and tropical storms create powerful near-shore currents that move significant volumes of sand southwest along the coast. Zones of highest beach erosion within the critical habitat area for wintering Piping Plover include southwest of the Galveston Island seawall (*i.e.* West Beach on Galveston Island), the Sargent Beach area, Matagorda Peninsula, and along South Padre Island. Areas that are stable or accreting include the beaches on southwestern Bolivar Peninsula, Matagorda Island, San Jose Island, and central Padre Island (Morton *et al.*, 2004).

Sources for sand used in beach nourishment may include excavation of the upper beach at the seaward base of the dunes (Figure 25), material dredged from channels or passes, or off-shore sources. The Texas General Land Office has funded about 34 beach nourishment projects between 2000 and 2007 (<http://www.glo.state.tx.us/coastal/erosion/projects/index.html>, accessed on 20 October 2008). Beach nourishment actions require Clean Water Act section 404 or Rivers and Harbors Act section 10 permit from the U.S. Army Corps of Engineers for dredge and fill activities below the mean high water mark, which is the highest non-storm tide of the year.

Shoreline protection and dune restoration are activities intended to act as wave barriers or increase the resistance of beaches and other coastline areas to erosion from tidal action. These projects typically involve actions such as placement of geotextile along the seaward toe of dunes, construction of bulkheads, installation of revetments and breakwaters, and planting

vegetation. The Texas General Land Office has funded about 47 shoreline protection projects and three dune stabilization projects between 2000 and 2007 ([http:// www.glo.state.tx.us/ coastal/ erosion/ projects/index.html](http://www.glo.state.tx.us/coastal/erosion/projects/index.html), accessed on 20 October 2008). As with beach nourishment activities, shoreline protection and dune restoration projects typically require Clean Water Act section 404 or Rivers and Harbors Act section 10 permit from the U.S. Army Corps of Engineers.

Figure 25. Beach nourishment activity near Port Aransas. Sand is being moved from the upper beach to the lower beach. Photo credit: R. L. Watson, 1 October 2008 ([http://texascoastgeology.com /pabeach /naturalduneseawall. html](http://texascoastgeology.com/pabeach/naturalduneseawall.html)).



The Texas Parks and Wildlife Department administers the State Beach Cleaning and Maintenance Assistance Program (31 Texas Administrative Code §25), which provides state financial assistance to qualified city and county governments for the purpose of cleaning and maintaining beaches that are accessible to the public. About 128 miles of beach are cleaned annually through this program (<http://www.cpa.state.tx.us/tpr/btm/btmnr/nr05.html>, accessed on 20 October 2008). The Texas General Land Office implements a voluntary Adopt-a-Beach program and sponsors statewide beach cleanups twice a year.

Beach cleaning activities range from volunteers hand-collecting trash and debris to use of mechanized equipment to rake debris from the sand or to push debris against the dunes or into an excavated trench. Of these activities, raking or pushing *Sargassum* up to the base of the dunes or burying it in a trench excavated on the beach are most affected by conservation issues associated with wintering Piping Plover. This is because *Sargassum* and associated wrack on the beach provide an important food and shelter component for wintering Piping Plover. Excavation and fill activities on beaches below the high water mark requires a Clean Water Act section 404 or Rivers and Harbors Act section 10 permit from the U.S. Army Corps of Engineers.

3.3.1.2 Past Section 7 Consultation Effects on Beach Maintenance Activities Two percent of the section 7 consultations (8 of 375 cases) in the record, which encompasses the period from 1991 through April 2008, involved beach maintenance activities. Seven of the cases were informal section 7 consultations and one was a formal section 7 consultation. The seven informal section 7 consultations were on the following projects.

- Beach nourishment to restore a beach area at Corpus Christi, Nueces County in 2000 (consultation no. 02-11-00-I-148). No section 7 consultation conclusion was provided in the record. The project area was not within designated critical habitat. The federal action was permitting by the U.S. Army Corps of Engineers.
- Dune stabilization at Rollover Pass at the east end of the Bolivar Peninsula in Galveston County in 2004 (consultation no. 02-13-04-I-0458). It was determined that the project "may affect, is not likely to adversely affect" Piping Plover and would not result in destruction or adverse modification of critical habitat. The project area was in designated critical habitat unit TX-37. The federal action was funding by the Federal Emergency Management Agency.
- Shoreline protection and beach nourishment on the Bolivar Peninsula in Galveston County in 2004 (consultation no. 02-13-04-I-0468). It was not clear whether the project area was within designated critical habitat or not. It was determined that the project "may affect, is not likely to adversely affect" Piping Plover. The federal action was permitting by the U.S. Army Corps of Engineers.
- Shoreline protection using geotextile tubes on Galveston Island in Galveston County in 2004 (consultation no. 02-13-04-I-0474). It was not clear whether the project area was within designated critical habitat or not. It was determined that the project "may affect, is not likely to adversely affect" Piping Plover. The federal action was funding by the Federal Emergency Management Agency.
- Beach nourishment at Quintana Beach near Freeport in Brazoria County in 2005 (consultation no. 02-13-05-I-0019). The

project area was not within designated critical habitat. It was determined that the project "may affect, is not likely to adversely affect" Piping Plover. The federal action was permitting by the U.S. Army Corps of Engineers.

- Shoreline protection (*i.e.* construction of a revetment) at the Village of Surfside in Brazoria County in 2007 (consultation no. 21430-2007-I-0271). The project area was not within designated critical habitat. It was determined that the project "may affect, is not likely to adversely affect" Piping Plover. The federal action was funding by the Federal Emergency Management Agency.
- Beach nourishment and grooming in a seven-mile stretch of beach within the city limits of Port Aransas in Aransas County in 2008 (consultation no. 21410-2008-I-0099). The project area is within proposed revised critical habitat unit TX-8. The consultation is still in progress and was triggered by a permit action by the U.S. Army Corps of Engineers.

One beach maintenance project was the subject of conferencing in a formal consultation because of adverse effects on proposed critical habitat of wintering Piping Plover. This project consisted of a proposal by the City of Corpus Christi to conduct cleaning activities and driving lane maintenance along a 21-mile section of beach from Port Aransas south to Padre Island National Seashore in Nueces County (consultation no. 21410-2006-F-0265). The federal nexus triggering section 7 consultation for this project was a permitting action by the U.S. Army Corps of Engineers. The project area was located within proposed revised critical habitat units TX-3D, TX-7, and TX-8. Although it was determined that the project "may affect, is not likely to adversely affect" wintering Piping Plover, it was concluded that primary constituent elements of proposed

revised critical habitat would be affected in 895 acres (U.S. Fish and Wildlife Service, 2008b: 35).

Conservation measures implemented to protect Piping Plover in section 7 consultations on beach maintenance projects may include minimizing the amount of beach driving during the August-to-March wintering period, avoiding driving near the swash zone where birds are feeding, avoiding driving high on the beach in the afternoon or on windy days when birds are likely to be roosting in vehicle ruts or behind debris, having a monitor on-site to determine if Piping Plover are in the area (U.S. Fish and Wildlife Service, 2008a). These measures may be recommended in any areas that are occupied by the species to avoid or minimize the potential for take.

With respect to critical habitat, conservation measures that may be recommended include smoothing over extensive vehicle ruts and avoiding oil or chemical spills on beaches (U.S. Fish and Wildlife Service, 2008a). Additionally, the Service recommended funding of a research program to determine the long-term effects of beach maintenance activities on Piping Plover roosting and feeding habitat (U.S. Fish and Wildlife Service, 2008b: 42).

3.3.2 Effects on Beach Maintenance

3.3.2.1 Alternative A - No Action Under the No Action Alternative, no critical habitat would be designated in the 19 court-vacated units (*i.e.* units 3, 4, 7, 8, 9, 10, 14, 15, 16, 17, 18, 19, 22, 23, 27, 28, 31, 32, and 33). Critical habitat would continue to be designated in the remaining 18 units that were not vacated by court order (*i.e.* units 1, 2, 5, 6, 11, 12, 13, 20, 21, 24, 25, 26, 29, 30, 34, 35, 36, and 37). Wintering Piping Plover along the Texas coast would continue to be listed as threatened under the ESA. Therefore, wherever the species is found, ESA section 7

consultation would be triggered under the jeopardy standard for federal-supported actions (*i.e.* actions that are federally permitted, authorized, funded, or sponsored in whole or in part). All of the court-vacated critical habitat units are considered to be occupied by the species and, therefore, would be subject to section 7 consultation under the jeopardy standard even in the absence of critical habitat designation.

Six designated critical habitat units that were not vacated by court order contain ocean beaches: TX-1, TX-6, TX-34, TX-35, TX-36, and TX-37. These areas would be most likely to have section 7 consultations on beach maintenance activities. Conservation recommendations to avoid or minimize impacts on beach maintenance activities, such as those described in section 3.3.1.2, would continue to be made during the course of section 7 consultations. Major issues associated with beach maintenance activities are associated with avoiding or minimizing take of Piping Plover, such as having monitors on-site to identify Piping Plover and smoothing out extensive ruts where Piping Plover may roost and be vulnerable to accidental mortality from vehicles driving on the beach. Critical habitat designation may interject some other considerations, but these are likely to be minor, such as installing information signs to notify the public of beach areas that are important for conservation of wintering Piping Plover (C. Yeargan, U.S. Fish and Wildlife Service, Clear Lake Ecological Services Field Office, pers. comm., 15 October 2008). Also, avoiding extensive removal of *Sargassum* and associated wrack on the beach, particularly during the wintering season, may also be recommended in designated critical habitat (D. Whitehead, U.S. Fish and Wildlife Service, Corpus Christi Ecological Services Field Office, pers. comm., 16 October 2008).

3.3.2.2 Alternative B - Proposed Action

Under Alternative B, critical habitat for wintering Piping Plover along the Texas coast would consist of the 18 units that were not vacated by court order as well as 18 of the 19 units that were vacated by the order and that would be revised as described in section 2.3. This would have the effect of requiring section 7 consultation when proposed federal actions may affect primary constituent elements in all designated critical habitat units. Section 7 consultation on potential effects to primary constituent elements associated with actions on private lands would occur only when a federal action, such as funding or permitting, is involved.

Nine proposed critical habitat units are located along stretches of coast line that are considered to be critical erosion areas. These units are most likely to include areas where beach maintenance projects are proposed. Proposed revised critical habitat units TX-31 and TX-32 include beach areas within the coastline segment from San Luis Pass south to Sargent Beach, of which 67 percent is considered to be critical erosion area (www.glo.state.tx.us/coastal/erosion/pdf/Report03-01-ErosionRates.pdf). Fifty-nine percent of the beach on the Matagorda Peninsula from Sargent Beach south to Pass Cavallo is considered to be critical erosion area. This segment includes portions of proposed revised critical habitat units TX-23, TX-27, and TX-28. Seventy-three percent of the beach on Mustang Island from Aransas Pass south to Packery Channel is considered critical erosion area, which includes units TX-7 and TX-8. Finally, 86 percent of South Padre Island beach from the Mansfield Channel south to Brazos Santiago Pass, which includes units TX-3A and TX-3B, is considered to be critical erosion area.

As beach erosion and shoreline protection become more of an issue, which is likely in the event of increased sea level and increased hurricane frequency and intensity brought about by climate

change (*cf.* section 3.2.1.3), the number of section 7 consultations on beach maintenance activities is likely to have a corresponding increase. Consequently, the baseline conditions for critical habitat may deteriorate as a result of more projects being implemented and habitat conditions declining due to sea level rise and storm impacts. Such a situation would be expected to produce more formal section 7 consultations with additional conservation measures and, possibly, mandatory reasonable and prudent alternatives in the event of destruction or adverse modification of designated critical habitat. This increase in section 7 consultations would occur under the Alternative A (No Action) as well, but the number of critical habitat units potentially involved would increase about 2.5-fold with Alternative B (Proposed Action).

3.4 Oil and Gas

3.4.1 Existing Conditions

3.4.1.1 Oil and Gas Leases Within Designated and Proposed Critical Habitat
Data from the Texas Railroad Commission show 18,620 wells located within the Texas Coastal Management Zone. Of these wells 3,906 (21 percent), are oil or gas wells. Another 1,294 (6.9 percent) are permitted wells. The only currently designated critical habitat unit containing wells that are listed as permitted locations, oil, gas, or oil/gas is unit TX-06. This unit, which is the Mollie Beattie Coastal Community area in Nueces County, contains two gas wells (API nos. 4235531772D1 and 4235532772D1), one oil/gas well (API no. 4235531585D1), and one permitted location (API no. 4235533015). Texas General Land Office geographic information system data (<http://www.glo.state.tx.us/gisdata/gisdata.html>, sublease_1008.shp, accessed on 6 October 2008) show a total of 1,518 oil and gas leases within the Texas Coastal Management Zone, which

encompasses all of the areas that are either designated or proposed as critical habitat for wintering Piping Plover. These 1,518 leases cover about 613,010 acres. Currently, about 2,595 acres of leases are within designated (non-vacated) critical habitat for wintering Piping Plover (units 1, 6, 13, 21, and 25; Table 7). The leased acreage within designated critical habitat composes 0.42 percent of all leased acreage within the Texas Coastal Management Zone.

The portions of leases within designated critical habitat for wintering Piping Plover include 10 leases that are active and another four that are listed as "shut-in" or released. A "shut-in" lease describes the situation where the primary term of the lease has expired but there is a well or wells within the lease that are capable of producing oil or gas in paying quantities. However, the oil or gas is not being produced for lack of suitable production facilities or a suitable market. In this instance, the lease is not terminated but is extended for a period of one year.

Critical habitat unit TX-1, located at South Bay near Boca Chica southeast of San Isabel in Cameron County, contains portions of leases MF106393, MF106394, MF106395, MF106396, MF106397, MF106398, and MF106399, all of which are active. Critical habitat unit TX-6, located at the Mollie Beattie Coastal Habitat Community in Nueces County, contains portions of leases MF056375 and MF 056376, which are listed as "shut-in." Critical habitat unit TX-13, located near Sunset Lake in San Patricio County, contains portions of leases MF066135, listed as "shut-in," and MF080160, listed as "released." Critical habitat unit TX-21, which is near Pringle Lake in Calhoun County, contains a portion of lease MF103337, which is active. Finally, critical habitat unit TX-25, located on Matagorda Peninsula southwest of Matagorda, contains portions of leases MF109223 and MF109224, both of which are active.

Table 7. Acreage of oil and gas leases within existing designated critical habitat for wintering Piping Plover. Lease data are only for state lands and was obtained from the Texas General Land Office (<http://www.glo.state.tx.us/gisdata/gisdata.html>, sublease_1008.shp, accessed on 6 October 2008).

Designated Critical Habitat Unit	Oil & Gas Lease Acres	Percent of Total Lease Acres
TX-1	2,068	79.7%
TX-6	158	6.0%
TX-13	3	0.1%
TX-21	283	10.9%
TX-25	83	3.2%
Total	2,595	100%

Additionally, there are about 104 acres of designated critical habitat within six tracts (MGL nos. 249, 250, 257, 258, 263, and 266) that are nominated for upcoming oil and gas sealed bid lease sales. Portions of these six tracts are within critical habitat unit TX-1, south of Brazos Santiago Pass along the Gulf shore of Brazos Island in Cameron County (<http://www.glo.state.tx.us/gisdata/gisdata.html>, subnominations_1008.shp, accessed on 6 October 2008).

3.4.1.2 Past Section 7 Consultation Effects on Oil and Gas Activities Sixteen percent of the section 7 consultations (61 of 375 cases) in the record have involved oil and gas activities. None of these consultations were formal and, therefore, none of the actions were likely to adversely affect wintering Piping Plover or designated critical habitat. Issues of concern for conservation of

wintering Piping Plover associated with oil and gas activities include avoiding or minimizing disturbance of Piping Plover that are present in a project area, smoothing over extensive vehicle ruts, minimizing driving on tidal flats to avoid creating ruts that may trap water and produce undesirable vegetation, using wide-track vehicles or boardwalks to access tidal flats and thereby prevent creating deep ruts, avoiding chemical spills, and avoiding discharging fresh water across unvegetated tidal flats (D. Whitehead, U.S. Fish and Wildlife Service, Corpus Christi Ecological Services Field Office, pers. comm., 17 October 2008; U.S. Fish and Wildlife Service, 2008a). Additionally, directional drilling from adjacent upland areas or previously disturbed areas may be recommended to avoid impacts to primary constituent elements in critical habitat (U.S. Fish and Wildlife Service, 2008a).

The economic analysis indicated that the cost of conservation activities for wintering Piping Plover along the Texas coast to oil and gas activities have included the following (Industrial Economics, Inc., 2008: 3-12 and 3-13):

- \$9,600 to \$29,000 per project for minimizing vehicle disturbance to wintering Piping Plover, which requires vehicle travel in convoys (Figure 26) and results in project delays;
- \$27,000 to \$60,000 per project for a biological monitor to be present on site to ensure that wintering Piping Plover are not adversely affected;
- \$1,000 to \$8,000 per project for smoothing over ruts, particularly on tidal flat areas; and
- \$7,100 administrative cost per section 7 consultation.

Figure 26. A vehicle convoy being escorted down the beach on Padre Island National Seashore. Photo credit: J. Pittenger, Blue Earth Ecological Consultants, Inc., 10 January 2008.



3.4.1.3 Oil and Gas Activities The primary oil and gas activities that occur in habitats of wintering Piping Plover are seismic testing, installation and maintenance of oil and gas wells, and production. Most of the informal section 7 consultations involving oil and gas activities have been on seismic testing actions (22 of 61 cases, or 36 percent) and well installation (21 of 61 cases, or 34 percent). Seismic testing involves drilling a small-diameter well to a depth of about 80 feet, placing an explosive charge (*ca.* five pounds) down the hole, detonating the charge, and recording the sound waves produced by the

detonation using a grid of cables and geophones arrayed on the ground surface around the detonation. The resulting data are used to characterize the subsurface geology of the area. Alternatively, a vibroseis truck can be used in the place of a subsurface detonation to create the sound waves. However, it appears that detonated subsurface charges are most commonly used in the project area, based on review of the section 7 consultation record. Cables and geophones are laid out using trucks or all-terrain vehicles.

Well installation involves preparation of access to the site and the well pad, drilling, installation of well casing, and installation of well-head facilities. Access to the site may require development of a roadway through surface grading and placement of culverts and surfacing material such as gravel or base course. Well pads are graded areas, typically on the order of about 5,000 ft², where the well head is located. Well-head facilities are located within the confines of the well pad and vary with the type of energy resource being developed. Other oil and gas activities in the section 7 consultation record include pipeline repair, abandonment, and installation (15 of 61 cases, or 26 percent), construction of roads or terminal facilities (2 of 61 cases, or three percent), and leasing actions (1 case, or two percent).

3.4.2 Effects on Oil and Gas

3.4.2.1 Alternative A - No Action Under the No Action Alternative, no critical habitat would be designated in the 19 court-vacated units. Critical habitat would continue to be designated in the remaining 18 units that were not vacated by court order. Wintering Piping Plover along the Texas coast would continue to be listed as threatened under the ESA. Therefore, wherever the species is found, ESA section 7 consultation would be triggered under the jeopardy standard for federal-supported actions (*i.e.* actions that are federally permitted, authorized, funded, or sponsored in whole or in part). All of the court-vacated critical habitat units are considered to be occupied by the species and therefore would be subject to section 7 consultation under the jeopardy standard even in the absence of critical habitat designation.

No oil and gas activities are likely to be prohibited with implementation of the No Action Alternative. However, project modifications to avoid or

minimize effects on wintering Piping Plover are estimated to cost about \$93,182 to \$215,909 per year under the jeopardy standard (Industrial Economics, Inc., 2008: 3-2; derived from 1985 to 2007 costs ranging from \$2.05 to \$4.75 million). These impacts would likely continue into the future with implementation of the No Action Alternative. Additionally, costs associated with avoiding destruction or adverse modification of designated critical habitat in the 18 units that were not vacated by court order would also occur with development of new wells. These costs are estimated to range from about \$400,000 to \$3.52 million per well (Industrial Economics, Inc., 2008: 3-20 to 3-21; derived from individual incremental costs per well drilled for avoiding discharge of fresh water, directional drilling, and addressing beach driving impacts).

3.4.2.2 Alternative B - Proposed Action

Under Alternative B, critical habitat for wintering Piping Plover along the Texas coast would consist of the 18 units that were not vacated by court order as well as 18 of the 19 units that were vacated by the order and that would be revised as described in section 2.3. This would have the effect of requiring section 7 consultation when proposed federal actions may affect primary constituent elements in all designated critical habitat units. Section 7 consultation on potential effects to primary constituent elements associated with actions on private lands would occur only when a federal action, such as funding or permitting, is involved.

Approximately 3,897 acres of leases involving the State of Texas are within proposed critical habitat (units 3C, 3D, 4, 7, 8, 10A, 10B, 10C, 15, 28, and 31; Table 8). These leases within proposed critical habitat compose 0.63 percent of all leases within the Texas Coastal Management Zone. Combined, designated and proposed critical habitat for wintering Piping Plover would include 6,492 acres, or 1.06 percent, of all leases

involving the State of Texas within the Texas Coastal Management Zone.

The portions of leases involving the State of Texas within designated critical habitat for wintering Piping Plover include 46 leases, 38 of which are active, three are producing, three are labeled as "no non-unit acres" (which pertains to royalty payments), one that is listed as "shut-in," and one that is listed as "terminated."

- Critical habitat unit TX-3C, located on bayside tidal flats on North Padre Island south of The Hole in Kenedy County, contains portions of six leases: MF108368 through MF108373, all listed as active, and MF102069, listed as "shut-in."
- Critical habitat unit TX-3D, located on the Gulf-side beach north of Padre Island National Seashore in Kleberg County, contains portions of three leases: MF104274, listed as active, and MF101386 and MF101387, both listed as "no non-unit acres."
- Critical habitat unit TX-4, located on mainland tidal flats at the Willacy-Cameron county line and on Laguna Atascosa National Wildlife Refuge, contains portions of 16 leases: MF106333, MF106339, MF106340, MF106347 through MF106355, MF106360 through MF106362, and MF106442, all of which are active.
- Critical habitat unit TX-7, located on the Gulf-side beach near Newport and Corpus Christi passes in Nueces County, contains portions of two leases: MF107868, listed as active, and MF069153, which is terminated.
- Critical habitat unit TX-8, located on the Gulf-side beach on Mustang Island in Nueces County, contains portions of three leases:

MF105753, MF105754, and MF105760, all of which are active.

- Critical habitat unit TX-10 (including subunits A, B, and C), located on Shamrock Island and adjacent bayside tidal flats in Nueces County, contains portions of nine leases, including the active leases MF104257, MF105659 through MF105661, MF106805, MF106806, and MF109214. Also included are portions of two other leases, MF101331 and MF101332, which are both listed as "no non-unit acres."
- Critical habitat unit TX-15, located at North Pass east of the City of Port Aransas in Aransas County, contains portions of three leases: MF031911 through MF031913, all of which are listed as "producing."
- Critical habitat unit TX-28, located on the beach at the east end of Matagorda Peninsula in Matagorda County, contains portions of two leases: MF106423 and MF106425, both of which are active.
- Critical habitat unit TX-31, located on the beach in San Bernard National Wildlife Refuge in Matagorda County, contains a portion of one lease: MF108131, which is active.

Table 8. Oil and gas leases and wells within proposed revised critical habitat for wintering Piping Plover. Lease data are only for state lands and were obtained from the Texas General Land Office (<http://www.glo.state.tx.us/gisdata/gisdata.html>, sublease_1008.shp, accessed on 6 October 2008). Well data include both public and private wells and are from the Texas Railroad Commission. *Unit TX-3B contains one injection well associated with gas production and three gas wells.

Proposed Critical Habitat Unit	Leases (Acres)	Wells - Permitted Locations	Wells - Oil and/or Gas
TX-3B	0	0	4*
TX-3C	1,907 (48.9%)	2	1
TX-3D	19 (0.5%)	0	0
TX-3E	0	1	0
TX-4	1,575 (40.4%)	0	1
TX-7	12 (0.3%)	0	0
TX-8	54 (1.4%)	0	0
TX-10A	3 (0.1%)	0	0
TX-10B	3 (0.1%)	0	0
TX-10C	144 (3.7%)	0	0
TX-15	82 (2.1%)	0	0
TX-16	0	0	1
TX-28	55 (1.4%)	0	0
TX-31	44 (1.1%)	0	1
Total	3,897	3	8

There are about another 136 acres of proposed critical habitat in five tracts (MGL nos. 218, 219, 222, 230, and 231) that are nominated for upcoming oil and gas sealed bid lease sales (<http://www.glo.state.tx.us/gisdata/gisdata.html>, subnominations_1008.shp, accessed on 6 October 2008).. About 12 acres are within lease tract 231 in proposed critical habitat unit TX-7, which is the beach on Mustang Island between Newport Pass

and Corpus Christi Pass. The remaining 124 acres are portions of lease tracts 218, 219, 222, and 230 in proposed critical habitat unit TX-8, which is the Mustang Island beach north of Corpus Christi Pass.

Selection of Alternative B would result in the inclusion of three permitted well locations and eight existing oil and/or gas wells within revised

designated critical habitat for wintering Piping Plover (Table 8). This would increase the number of permitted well locations from one to four and the number of oil and/or gas wells from three to 11. This translates to 0.31 percent of the total number of permitted locations and 0.28 percent of the total number of oil and/or gas wells within the Texas Coastal Management Zone.

The economic analysis concluded that costs would increase by \$400,000 to \$3.52 million for oil or gas well installation within designated critical habitat (Industrial Economics, Inc., 2008: 3-20 to 3-21). These additional costs would be incurred in the 18 court-vacated units that are proposed for revised critical habitat designation with the proposed action. These costs are attributable to measures recommended to avoid or minimize impacts to primary constituent elements of critical habitat such as directional drilling, avoiding stockpiling dredged material on tidal flats, avoiding chemical spills on beaches or tidal flats, and avoiding discharging fresh water across tidal flats (Industrial Economics, Inc., 2008: 3-15). Costs associated with section 7 consultation under the jeopardy standard would not change, as all of the currently vacated units proposed for critical habitat designation are considered to be occupied by the species.

3.5 Waterway Facilities and Maintenance

3.5.1 Existing Conditions

This resource category includes maintenance of shipping and boating waterways and associated facilities such as the Gulf Intracoastal Waterway, the Corpus Christi Channel, the Brownsville Ship Channel, port facilities, and pass channels from bays and inland waterways to the Gulf of Mexico (e.g. San Luis Pass, Freeport Harbor Channel,

Pass Cavallo, Aransas Pass, Mansfield Channel, Brazos Santiago Pass).

There are 16 navigation districts and approximately 854 miles of maintained shipping channel within the Texas Coastal Management Zone (<http://www.glo.state.tx.us/gisdata/gisdata.html>, [navdistrictp.shp](#) and [giww.shp](#), accessed on 6 October 2008). Two designated critical habitat units that were not vacated by court order include segments of shipping channels. Unit TX-37 (Rollover Pass) in Galveston County includes about 1.61 miles of the Gulf Intracoastal Waterway. Unit TX-26 (Colorado River Diversion Delta) in Matagorda County includes about 2.45 miles of channel between the Gulf Intracoastal Waterway and Matagorda Bay. About 7,865 acres, split among three navigation districts, are located within designated critical habitat for wintering Piping Plover in units that were not vacated by court order. Unit TX-1 (South Bay and Boca Chica) in Cameron County contains about 1,268 acres or about 32 percent of the 3,970-acre Brownsville Navigation District area. Unit TX-6 (Mollie Beattie Coastal Community) in Nueces County contains about 2,165 acres or about three percent of the Arroyo Colorado Navigation District area, which encompasses about 79,962 acres. Unit TX-13 (Sunset Lake) in San Patricio County contains about 4,437 acres or 21 percent of the 21,396-acre Nueces County Navigation District No. 1.

The primary maintenance activity associated with waterways is dredging to maintain adequate shipping channel width and depth. Dredging is conducted on a regular basis, as often as annually in some areas such as the Gulf Intracoastal Waterway through the Laguna Madre. Dredged material is placed in designated areas along channels. There are about 91,889 acres of designated dredged material placement areas within the Texas Coastal Management Zone (<http://www.glo.state.tx.us/gisdata/gisdata.html>,

dredgedsites.shp, accessed on 6 October 2008). Six dredged material placement areas (DMPAs) are located within designated critical habitat units that were not vacated by court order. Unit TX-1 (South Bay and Boca Chica) in Cameron County 92.1 acres in DMPA site 2 and 538.6 acres in DMPA site 4. Unit TX-6 (Mollie Beattie Coastal Community) in Nueces County contains 43.2 acres in DMPA site 172 and 52 acres in DMPA site 173. Finally, unit TX-30 (Northeast Corner of East Matagorda Bay) in Matagorda County contains 2.3 acres in DMPA site 100 and 18 acres in DMPA site 101.

Six percent of the section 7 consultations (23 of 375 cases) in the record, which encompasses the period from 1991 through April 2008, involved waterway facilities and maintenance activities. Federal actions triggering section 7 consultation on waterway facilities and maintenance activities included permit issuance by the U.S. Army Corps of Engineers or the U.S. Environmental Protection Agency and actions proposed directly by the U.S. Army Corps of Engineers. Twenty-one of the cases were informal section 7 consultations and two were formal section 7 consultations. The first formal consultation, triggered by Rivers and Harbors Act section 10 and Clean Water Act section 404 permitting processes by the U.S. Army Corps of Engineers, was on a proposal in 1994 to re-open and maintain the Packery Channel (consultation no. 02-11-92-F-024). This project was never implemented. The second formal section 7 consultation was for a similar proposal that was initiated in 2000 by the U.S. Army Corps of Engineers in partnership with the City of Corpus Christi (consultation no. 21410-2002-F-0255).

Eighteen of the 21 informal consultations on waterways projects involved dredging actions. None of these actions were concluded to be likely to adversely affect wintering Piping Plover or result in destruction or adverse modification of

critical habitat. Conservation measures that may be recommended to avoid or minimize impacts to wintering Piping Plover and its habitat during waterway maintenance activities include monitoring to determine the presence of Piping Plover, avoiding disturbance of foraging or roosting birds, avoiding placing dredged material on sand flats, and avoiding oil or chemical spills (U.S. Fish and Wildlife Service, 2003*b*; U.S. Fish and Wildlife Service, 2008*a*).

3.5.2 Effects on Waterway Facilities and Maintenance

3.5.2.1 Alternative A - No Action Section 7 consultations on waterway facilities and maintenance projects would continue to occur in all occupied habitats and designated critical habitat units that were not vacated by court order. Section 7 consultations have not prohibited maintenance of the Gulf Intracoastal Waterway or associated channels in the past and would be unlikely to do so in the future with selection of the No Action Alternative. Maintenance of shipping channels and placement of dredged material in existing designated critical habitat in units TX-1, TX-6, TX-13, and TX-30 would require analysis under the adverse modification standard as well as the jeopardy standard. Critical habitat considerations have not interjected substantial additional conservation measures in section 7 consultations on waterway facilities and maintenance projects in the past and therefore would be unlikely to do so in the future. The costs associated with waterway facilities and maintenance project modifications for conservation of wintering Piping Plover with the No Action Alternative are estimated to range from about \$566 to \$286,000 per action (Industrial Economics, Inc., 2008: 6-6).

3.5.2.2 Alternative B - Proposed Action Under Alternative B, critical habitat for wintering

Piping Plover along the Texas coast would consist of the 18 units that were not vacated by court order as well as 18 of the 19 units that were vacated by the order and that would be revised as described in section 2.3. This would have the effect of requiring section 7 consultation when proposed federal actions may affect primary constituent elements in all designated critical habitat units.

Implementation of Alternative B (the Proposed Action) would increase the miles of shipping channel and acres of DMPAs that are within designated critical habitat for wintering Piping Plover. The mileage of shipping channel within designated critical habitat for wintering Piping Plover with Alternative B would increase slightly from about 4.06 miles to 4.29 miles. This represents about a six percent increase in shipping channel located within designated critical habitat. Overall, only about 0.5 percent of all shipping channel within the Texas coastal Management Zone would be within designated critical habitat for wintering Piping Plover with Alternative B.

Most of the increase shipping channel mileage would be in unit TX-27 (East Matagorda Bay/Matagorda Peninsula Beach West) in Matagorda County, which would include 0.22 miles of the Gulf Intracoastal Waterway. Unit TX-4 (Lower Laguna Madre Mainland) in Willacy County would include about 0.01 miles of the Gulf Intracoastal Waterway.

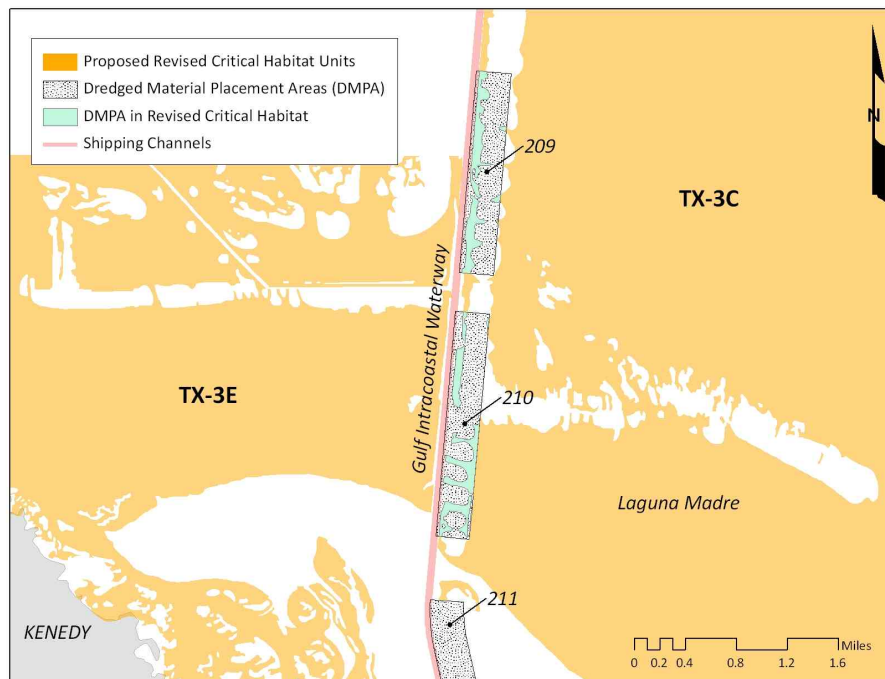
Designation of revised critical habitat with Alternative B would increase the acreage of DMPAs within critical habitat by about 842 acres, which would increase the total acreage of DMPAs within critical habitat from 746 to 1,588. This total acreage represents about 1.7 percent of all designated DMPAs within the Texas Coastal Management Zone. The added acreage of DMPAs in critical habitat would result from revised designation of units TX-3B, TX-3C, TX-

4, TX-16, TX-28, and TX-31 (Table 9). Most of the increased acreage of DMPAs in critical habitat would occur in units TX-3C (North Padre Island - Interior) in Kenedy County, which would compose about 56 percent of the increase, and TX-4 (Lower Laguna Madre Mainland) in Willacy County, which would compose another 34 percent of the increase (Table 9).

Dredged material placement areas have been cited as potentially having a negative effect on the hydrologic regime of mudflats in the Laguna Madre (Drake, 1999a; Zonick, 2000). At least four maintenance dredging projects in the Gulf Intracoastal Waterway, three of which were in the Laguna Madre, underwent section 7 consultation between 2001 and 2006, when full critical habitat designation was in place. However, none of the actions were determined to result in a determination of destruction or adverse modification of critical habitat. To date, DMPAs have not appeared to be a major issue in section 7 consultations involving wintering Piping Plover. Nonetheless, proposed revised critical habitat units TX-3C, TX-3E, and TX-4 (Figures 27 and 28) contain mudflat habitat in the Laguna Madre that may potentially be affected by DMPAs. Should section 7 analysis under the adverse modification determine that there may be potential adverse effects of DMPAs on primary constituent elements in these units, additional conservation recommendations may be required.

Table 9. Dredged material placement areas within proposed revised critical habitat units.

Proposed Revised Critical Habitat Unit	DMPA Sites	Acres
TX-3B	4B, 5, 6	11.2
TX-3C	205, 206, 207, 208, 209, 210, 211	467.9
TX-4	221, 222, 223, 224, 225, 226, 228, 230, 231	287.2
TX-16	2	1.4
TX-28	98	32.0
TX-31	96B	16.8
Total		842.2

**Figure 27.** Some of the DMPAs in units TX-3C and TX-3E with implementation of the proposed action. Numbers pointing to the DMPAs are the designated site labels.

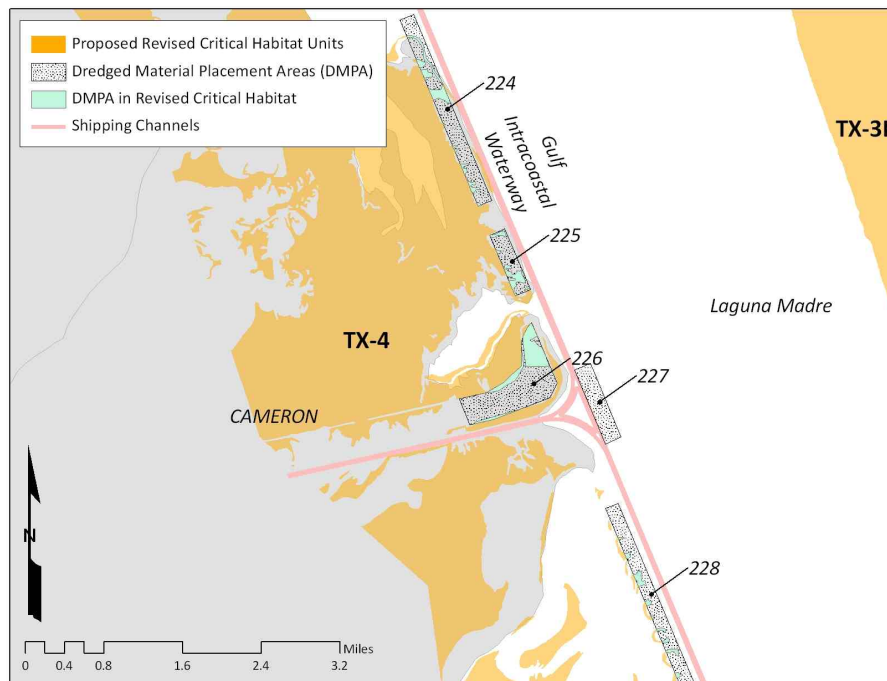


Figure 28. Some of the DMPAs in unit TX-4 with implementation of the proposed action. Numbers pointing to the DMPAs are the designated site labels.

3.6 Land Development

3.6.1 Existing Conditions

Land development projects along the Texas coastline range from construction or rebuilding of single-family homes to large commercial developments. Habitats occupied by wintering Piping Plover are typically not locations proposed for developments, with the exception of certain facilities associated with residential developments such as boat docks or marinas. This is because the habitat of wintering Piping Plover consists of unvegetated beaches, mudflats, sand flats, algal flats, and washover passes that are subject to inundation on fairly frequent basis from tidal action or storm surges. However, development does occur behind coastal dunes on privately owned tracts.

Most land development projects do not have a federal nexus (*i.e.* they do not require federal permitting and do not involve federal funding), although those that involve filling of jurisdictional wetlands or other waters of the U.S. require a federal Clean Water Act section 404 permit from the U.S. Army Corps of Engineers. The primary concern in conservation of wintering Piping Plover, with respect to land development, is the associated increase in disturbance and predation (C. Yeargan, U.S. Fish and Wildlife Service, Clear Lake Ecological Services Field Office, pers. comm., 15 October 2008). Areas with substantial development adjacent to habitat of wintering Piping Plover include Freeport and Surfside (Brazoria County; Figure 29), Port Aransas (Nueces County), Corpus Christi (Nueces County), and South Padre Island (Cameron County).



Figure 29. Aerial view of the Village of Surfside, Brazoria County. Photo credit: R. L. Watson, (<http://texascoastgeology.com/pabeach/naturalduneseawall.html>).

Forty-two percent (136 cases) of all informal section 7 consultations and three of the formal consultations were on land development projects. The majority of these projects consisted of residential or commercial developments, but this category also included other developments such as landfills, water system improvements, brush clearing, and stormwater management facilities. The three formal consultations on land development projects were for construction of a marina on South Padre Island in Cameron County (consultation no. 02-11-92-F-0010), a residential and commercial development plan in Nueces County (consultation no. 02-11-95-F), and a commercial development in Cameron County (consultation no. 02-11-97-F-0146-R1). The federal action that triggered section 7 consultation in all three of these cases was Clean Water Act section 404 and/or Rivers and Harbors Act section 10 permitting process conducted by the U.S.

Army Corps of Engineers. All of the formal consultations concluded that the actions would not jeopardize the continued existence of wintering Piping Plover.

Conservation measures included in section 7 consultations on land development projects include avoiding or minimizing the amount of habitat for wintering Piping Plover that may be directly affected, avoiding stockpiling or placing fill on sand flats, avoiding oil or chemical spills, and avoiding discharging fresh water across unvegetated tidal flats (e.g. in developing stormwater management facilities), monitoring project areas for the presence of Piping Plover, implementing regulations to require keeping household pets on leashes while outdoors, and avoiding planting vegetation on unvegetated sand- or mudflats.

3.6.2 Effects on Land Development

3.6.2.1 Alternative A - No Action Under the No Action Alternative, no critical habitat would be designated in the 19 court-vacated units (*i.e.* units 3, 4, 7, 8, 9, 10, 14, 15, 16, 17, 18, 19, 22, 23, 27, 28, 31, 32, and 33). Critical habitat would continue to be designated in the remaining 18 units that were not vacated by court order (*i.e.* units 1, 2, 5, 6, 11, 12, 13, 20, 21, 24, 25, 26, 29, 30, 34, 35, 36, and 37). Wintering Piping Plover along the Texas coast would continue to be listed as threatened under the ESA. Therefore, wherever the species is found, ESA section 7 consultation would be triggered under the jeopardy standard for federal-supported actions (*i.e.* actions that are federally permitted, authorized, funded, or sponsored in whole or in part). All of the court-vacated critical habitat units are considered to be occupied by the species and therefore would be subject to section 7 consultation under the jeopardy standard even in the absence of critical habitat designation.

Conservation recommendations for Piping Plover would continue to be recommended in section 7 consultations on land development projects that have a federal nexus. The likelihood of there being substantial numbers of land development projects in the future with a federal nexus is low. This is because developed areas are not likely to be sited in jurisdictional wetlands or other waters of the U.S., which would require a federal Clean Water Act section 404 permit for the U.S. Army Corps of Engineers. The estimated cost of implementing conservation recommendations in land development projects that do have a federal nexus and thus are subject to section 7 consultation ranges from about \$2,002 to \$2,202 per acre (Industrial Economics, Inc., 2008: 4-9).

3.6.2.2 Alternative B - Proposed Action

Revised critical habitat designation in 18 of the 19 court-vacated units, as described in section 2.3, is unlikely to interject any additional conservation measures in section 7 consultations on land development projects. This is because the proposed critical habitat areas are not suitable for development. Indirect impacts to habitat that may occur from land development such as storm-water discharge, leashing pets, containing trash to prevent attracting predators on Piping Plover, have been and would continue to be addressed under the jeopardy standard.

3.7 Recreation

3.7.1 Existing Conditions

3.7.1.1 Recreation Activities Within Critical Habitat Recreation activities along the Texas Gulf coast include a wide range of actions, such as fishing, swimming, boating, camping, birding, beach-combing, driving for pleasure, camping, walking or hiking, bicycling, photography, and horseback riding. Most, if not all, of these activities occur within designated or proposed revised critical habitat for wintering Piping Plover on the Gulf side (Figure 30). Due to frequently inaccessible (*e.g.* too wet for roads or trails) or inhospitable conditions (*e.g.* lots of mosquitos, few dry areas for hiking or camping) on the bayside mudflats, sand flats, and algal flats, recreation activities in these areas are limited in scope and geographic extent in designated or proposed revised critical habitat units.

Figure 30. Recreationists along a stretch of Texas Gulf coast beach proposed as wintering Piping Plover critical habitat on South Padre Island (Unit TX-3A).



As discussed in section 3.3, the Texas General Land Office is responsible for management of the Texas coast from the vegetation line on the beach to 10.3 miles into the Gulf of Mexico. Whether areas landward of the beach are privately owned or managed by federal, state, or local entities, the entire coastline is open to the public in accordance with the Texas Open Beaches Act (Natural Resources Code, Chapter 61, Use and Maintenance of Public Beaches). The law allows “free and unrestricted public access to beaches “

and does not restrict vehicles from the beach unless specifically prohibited by a local government in accordance with the General Land Office (§61.022).

With such access available, many beaches along the coast experience year-round vehicular traffic. Vehicles are driven along the beach in order to reach specific destinations for people to participate in recreational activities, or sometime the beach-driving is a recreational activity itself.

There is a paucity of specific visitor use data for Texas beaches in the area of analysis. Visitor data is generally only available for sites which charge entrance fees, and those data are limited to the number of vehicles entering the site. The number of visitors who participate in various activities once they enter a federal, state, or local recreation area, park, or wildlife refuge is usually not tracked.

Critical habitat for wintering piping plover in Texas is proposed for parts of three national wildlife refuges managed by the Service: San Bernard (unit 31), Matagorda Island (units 16, 18, and 19), and Laguna Atascosa (units 3 and 4). Figure 31 displays visitor use data at these refuges from 2002 through 2007. (Note: Matagorda Island National Wildlife Refuge is managed as a unit of Aransas National Wildlife Refuge and does not keep separate visitation counts.) Visitor use has varied widely from 2002 through 2008 for all three refuges (Figure 31). For example, visitation increased more than 50 percent at Aransas National Wildlife Refuge from 2005 to 2006. During the same period, there was a more than 15 percent drop in visitation at San Bernard National Wildlife Refuge. However, trends in visitor use at all of the refuges during the six-year period for which data is available still indicate a steady increase in overall visitation.

Although no critical habitat units for wintering Piping Plover are currently proposed within the Padre Island National Seashore located in Kleberg and Kenedy counties, some visitor use of the beaches may be extrapolated from National Park Service data for the park. Table 10 shows the number of vehicles entering Padre Island National Seashore each year. Visitor use at the park rose steadily from 2004 through 2006 but then declined in 2007 and 2008. According to National Park Service staff, nearly every vehicle entering the park is driven onto one or more sections of open beach (K. Messenger, Ranger Activities Assistant,

Padre Island National Seashore, pers. comm., 21 October 2008). Nearly all vehicles are likely driven within the first five miles of South Beach from the visitor center south, as this stretch of beach is accessible by two-wheel drive vehicles. Past the five-mile marker, there are 55 miles of beach accessible only by four-wheel drive vehicles. The National Park Service has no reliable data on how many drivers use this stretch of beach.

Table 10. Number of visitor vehicles entering Padre Island National Seashore by year. Data provided by National Park Service, Padre Island National Seashore. Data for 2008 are through 30 September.

Year	Number of Vehicles Entering Park
2004	616,815
2005	668,377
2006	732,794
2007	660,117
2008	364,558

Assuming a steady increase in recreation demand, it is likely that more recreation-related construction proposals would continue at the same or an increased rate. Recreation developments can also result in a circular “if you build it, they will come” situation in that higher user numbers means increased receipts. Increased receipts may provide additional monies for new infrastructure.

A. San Bernard NWR

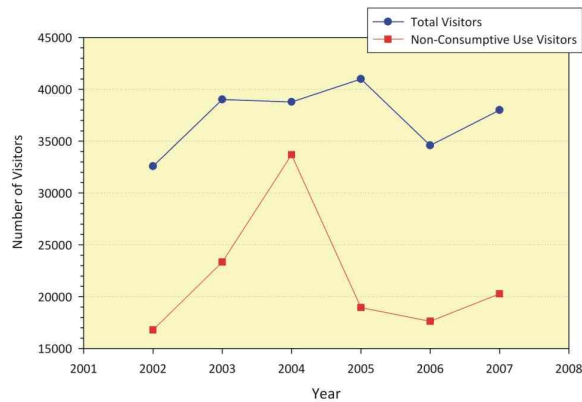
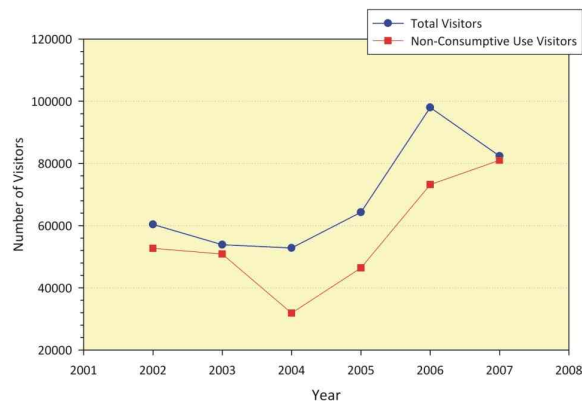
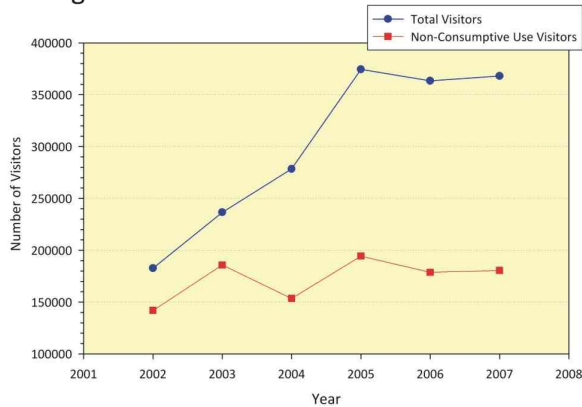


Figure 31. Estimated annual visitors at three Gulf coast national wildlife refuges which contain portions of six proposed Piping Plover critical habitat units. Data provided by U.S. Fish and Wildlife Service, Southwest Regional Office and does not include hunting and fishing visits. Years refer to fiscal year (1 October through 30 September).

B. Aransas NWR



C. Laguna Atascosa NWR



3.7.1.2 Past Section 7 Consultation Effects on Recreation Activities

Recreation-related consultations comprised about four percent of the total section 7 consultations from 1991 through April 2008 (Table 5). All of these cases were informal section 7 consultations. The 15 projects consisted mainly of proposals to construct recreation facilities, such as boat ramps, fishing piers, docks, and trails, or administrative facilities, including restrooms, a visitor center, and a maintenance building. About two-thirds of the projects occurred on federal land (e.g. national wildlife refuge or national park system unit). The remaining consultations were triggered by a need for federal permitting or authorization, usually a Clean Water Act section 404 permit from the U.S. Army Corps of Engineers. Six of the projects were determined to have no effect on wintering Piping Plover. For six other projects, it was determined that the action “may affect, is not likely to adversely affect” wintering Piping Plover. The determinations are unknown for the three remaining projects.

3.7.2 Effects on Recreation

3.7.2.1 Alternative A - No Action The No Action Alternative, that is, not designating revised critical habitat for wintering Piping Plover in the court-vacated Texas units, would not affect availability or management of public or private recreation activities as no changes to management would occur. Six designated critical habitat units that were not vacated by court order contain ocean beaches: TX-1, TX-6, TX-34, TX-35, TX-36, and TX-37. These units would be most likely to involve beach driving and individual or small group recreation activities that may disturb foraging or roosting Piping Plover under the section 7 jeopardy standard. However, recreation activities involving individuals or small groups, such as those described above (*i.e.* swimming,

fishing, boating), have not been subject to section 7 consultation.

Recreation management actions proposed by federal agencies (*e.g.* national wildlife refuges, national parks, national historical sites), in occupied Piping Plover habitat would continue to be subject to section 7 consultation. Likewise, state, local, or private recreation-related actions proposed in occupied Piping Plover habitat in Texas and which have a federal nexus (*e.g.* federal funding or permitting) would continue to be subject to section 7 consultation, regardless of whether or not critical habitat is present.

3.7.2.2 Alternative B - Proposed Action

Designation of revised critical habitat would not affect existing individual recreation activities in occupied wintering Piping Plover habitat in Texas due to the reasons described for Alternative A. If Alternative B is selected, the effect of section 7 consultations on recreation management actions would not change from the existing condition (*i.e.* No Action). Section 7 consultations, as described in 3.7.2.1, would continue to assess effects to wintering Piping Plover due to impacts to the species.

Designation of revised critical habitat for wintering Piping Plover in Texas is unlikely to add to project costs for recreation facility construction. Section 7 consultation costs would still be incurred, and the addition of the critical habitat considerations of effects on primary constituent elements would have little bearing on the cost or outcome of consultation. As noted in section 3.7.1.2, of the 15 recreation-related consultations, at least six were considered to have no effect and at least another six were concluded to “may affect, is not likely to adversely affect” wintering Piping Plover. It is reasonable to assume, then, that there would be no “adverse affect” conclusions on similar future projects

which is likely, if not to encourage, then at least not to discourage additional recreation-construction proposals in the future.

Proposed revised critical habitat units TX-3A, TX-3B, TX-7, TX-8, TX-23, TX-27, and TX-28 are the units which have Gulf-side beaches and, therefore, would be most likely to involve beach driving and individual or small group recreation activities that may disturb foraging or roosting Piping Plover. Although these activities are identified as major threat to Piping Plover, they are not activities that are subject to section 7 consultation and, therefore, there would be no effect on these recreation activities from selection of the proposed action.

3.8 Socioeconomic Conditions and Environmental Justice

Regulations for implementing NEPA require analysis of social effects when they are interrelated with effects on the physical or natural environment (40 CFR §1508.14). Federal agencies are also required to "*identify and address disproportionately high and adverse human health or environmental effects*" of their programs and actions on minority populations and low-income populations, as directed by Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations).

3.8.1 Existing Conditions

3.8.1.1 Population Characteristics All areas proposed as revised critical habitat for the wintering Piping Plover in Texas are undeveloped lands. The analysis area for socioeconomic effects discussed in this EA includes nine counties in Texas: Aransas, Brazoria, Calhoun, Cameron,

Kenedy, Kleberg, Matagorda, Nueces, and Willacy. Table 11 shows the population of each county in analysis area, combined population for the nine counties, and the population of the State of Texas as reported by the 2000 U.S. Census. Three counties had populations greater than 200,000, according to the 2000 U.S. Census (U.S. Census Bureau, 2008a). Cameron County, which includes the cities of Brownsville, Harlingen, and South Padre Island, had the largest population (334,277), followed closely by Nueces County (313,645), in which Corpus Christi is located. Brazoria County with 241,767 citizens, includes suburbs of Houston and the city of Lake Jackson. The remaining six counties each had populations of less than 40,000, with Kenedy County having only 414 residents (Table 11).

Racial and ethnic characteristics of the population of the State of Texas and of the combined nine counties in the analysis area, based on the 2000 U.S. Census (U.S. Census Bureau, 2008a), are displayed in Figure 32. Racially, the population of Texas in 2000 was similar to that of the nine combined counties in that roughly three-quarters of each population is white (71 and 76 percent, respectively; Figure 32A). Texas had more than twice the percentage of black citizens (11.5 percent) than the analysis area (4.2 percent). In the analysis area 15.2 percent of the population considered themselves as members of "some other race," which was slightly higher than the rest of the state as a whole (11.7 percent). Across Texas, about 32 percent of the population identified themselves Hispanic or Latino (U.S. Census Bureau, 2008b), which was substantially fewer than the more than 56 percent of population in the analysis area who were identified as Hispanic or Latino (Figure 32B).

Table 11. Population of the area of analysis. The table shows the populations of the State of Texas and the nine Texas counties which include the areas proposed for designation of revised critical habitat for the wintering Piping Plover based on Census 2000 data. Populations estimates for 2006 are shown for the State of Texas and the three largest counties in the analysis area. (U.S. Census Bureau, 2008a).

Location	2000 Population	2006 Population Estimate	Percent Increase
State of Texas	20,851,820	23,507,783	12.7%
Aransas County	22,497	not available	n/a
Brazoria County	241,767	287,898	19.1%
Calhoun County	20,647	not available	n/a
Cameron County	335,277	387,717	15.7%
Kenedy County	414	not available	n/a
Kleberg County	31,549	not available	n/a
Matagorda County	37,957	not available	n/a
Nueces County	313,645	321,457	2.5%
Willacy County	20,082	not available	n/a
Total Population of Counties in Analysis Area	1,023,785	not available	n/a

3.8.1.2 Communities The nine-county analysis area includes communities ranging from small cities to small towns, as well as undeveloped rural areas. Corpus Christi is the largest city in the area of analysis, with a 2000 U.S. Census population and 2007 population estimate of less than 300,000 (U.S. Census Bureau, 2008a).

Brownsville had a 2000 population of almost 140,000. Several counties, including Willacy, Kenedy, and Aransas, have no towns with more than about 8,000 population. The larger cities in the analysis area (e.g. Corpus Christi, Brownsville, Harlingen, Lake Jackson, Bay City) are full-service communities with fire, police, emergency medical services, hospitals, schools, libraries, and airports.

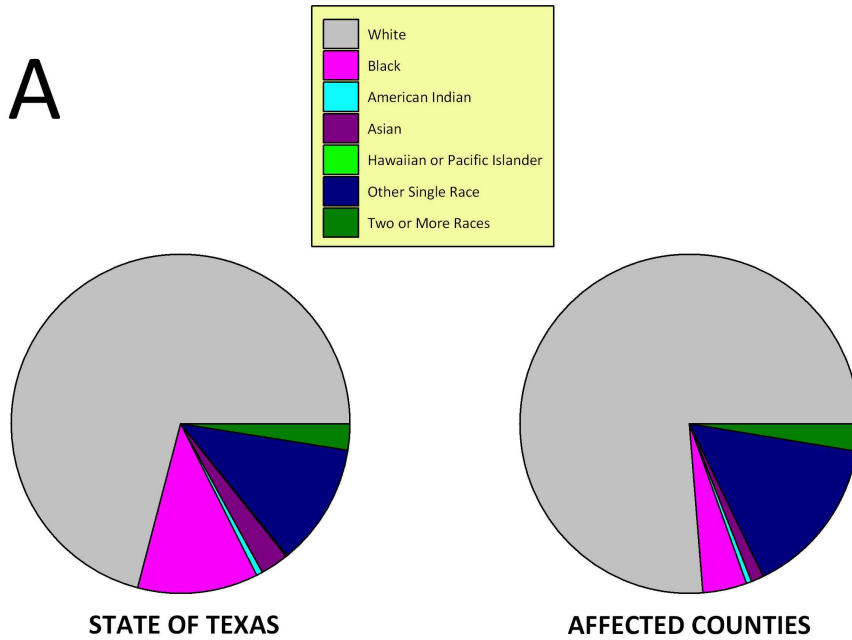
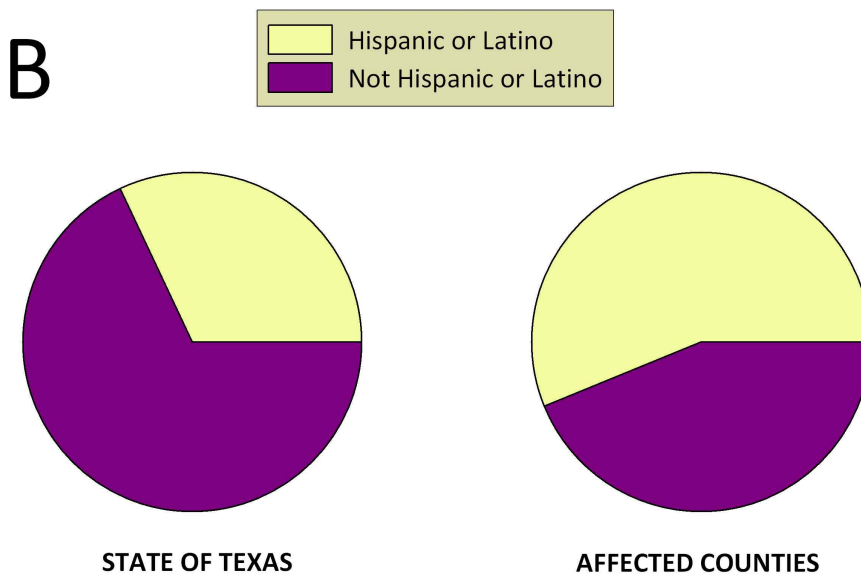


Figure 32. Race and ethnicity characteristics of the analysis area. “A” shows percentage of the total population by race in Texas (pie chart on the left) and in the combined affected counties (pie chart on the right). Percentage of the population that is Hispanic or Latino is shown in “B”. Source: (U.S. Census Bureau, 2008a; U.S. Census Bureau, 2008b).



3.8.1.3 Economy The nine-county analysis area is generally less well-off financially than the rest of the State of Texas. In 1999, per capita income averaged \$15,593 in the combined nine-county analysis area, which was about 84 percent of the income for the average Texan (U.S. Census Bureau, 2008c). All but one county in the analysis area (Brazoria) had a per capita income less than the statewide average (Table 12). Conversely, all counties except Brazoria had a higher percentage of individuals living below the federal poverty level in 2000 as compared to the entire state. Three of the nine counties had about double the percentage of persons living below poverty level as compared to 15.4 percent across the State of Texas (U.S. Census Bureau 2008d). Cameron and Willacy counties each had more than 33 percent of their populations living below poverty level, and Kleberg County had almost 27 percent of its population living below poverty level. The combined average of individuals living below poverty level in all nine counties was 21.3 percent (Table 12), almost 40 percent higher than for the entire state population (Figure 33).

As shown in Table 13, the three top occupational categories in 2000 for the combined nine-county analysis area were: 1) management, professional, and related occupations (29.1 percent); 2) sales and office occupations (22.4 percent); and 3) service occupations (18.2 percent). Employment by industry in the analysis area is shown in Table 14. Education, social services, and health care accounted for one-fifth of all jobs. Another 40 percent of jobs were divided about equally among: 1) agriculture, forestry, fishing, hunting, and mining (10.5 percent); 2) manufacturing (10.1 percent); 3) retail trade (10.4 percent); and 4) construction (9.0 percent). Hospitality, recreation, arts and entertainment industries composed just over eight percent (U.S. Census Bureau, 2008e).

Table 12. Comparison of per capita income (1999) and percentage of individuals living below poverty level for the nine counties in the Piping Plover analysis area and the State of Texas. U.S. Census Bureau 2000 data (U.S. Census Bureau, 2008c; U.S. Census Bureau, 2008d).

Location	Per Capita Income	Percent Below Poverty Level
State of Texas	\$19,617	15.4%
Aransas County	\$18,560	19.9%
Brazoria County	\$20,021	10.2%
Calhoun County	\$17,125	16.4%
Cameron County	\$10,960	33.1%
Kenedy County	\$17,959	15.3%
Kleberg County	\$13,542	26.7%
Matagorda County	\$15,709	18.5%
Nueces County	\$17,036	18.2%
Willacy County	\$9,421	33.2%
Nine-County Average	\$15,593	21.3%

The economic analysis by Industrial Economics, Inc. (2008) estimated current costs of conservation of wintering Piping Plover in the 18 proposed revised critical habitat units as \$180,000 to \$1.3 million annually (Industrial Economics, Inc., 2008: ES-4). It is noteworthy, however, that most of these costs are the result of joint conservation efforts for other species, in particular five species of listed sea turtles, which utilize the same habitats as Piping Plover. Many of these costs would be incurred for sea turtle conservation regardless of whether or not critical habitat is designated for wintering Piping Plover along the Texas coast.

Figure 33. Poverty level of individuals in the analysis area. Pie chart on left shows percentage of all individuals in Texas living above and below the federal poverty level. The pie chart on the right shows the same information for the individuals in the affected counties (U.S. Census Bureau, 2008d).

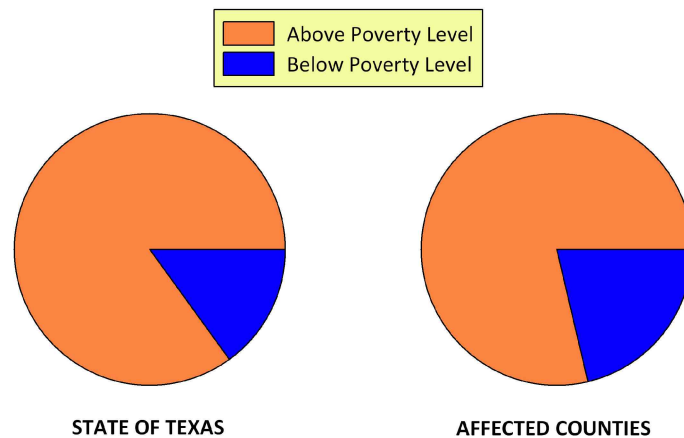


Table 13. Occupation of the employed population in the nine-county area (U.S. Census Bureau, 2008e).

Occupation	Percent of Employed Population
Management, professional, and related	29.1%
Service	18.2%
Sales and office	22.4%
Farming, fishing, and forestry	4.3%
Construction, extraction, and maintenance	13.0%
Production, transportation, and material-moving	13.0%

Table 14. Employed civilian population age 16 years and older by industry in the nine-county area of analysis, based on U.S. Census Bureau sampling data (U.S. Census Bureau, 2008e).

Industry	Percent of Nine-County Total
agriculture, forestry, fishing, hunting, mining	10.5%
construction	9.0%
manufacturing	10.1%
wholesale trade	2.5%
retail trade	10.4%
transportation, warehousing, utilities	5.5%
information	1.3%
finance, insurance, real estate	4.1%
professional, scientific, management	6.0%
educational, health, social services	21.1%
arts, entertainment, recreation, hospitality	8.2%
other services	4.9%
public administration	6.5%
Total	100%

3.8.2 Effects on Socioeconomic Conditions and Environmental Justice

3.8.2.1 Alternative A - No Action With the No Action Alternative, section 7 consultation under the jeopardy standard would be required on federal actions that have the potential to affect Piping Plover. No analysis under the adverse modification standard would be required with no designation of critical habitat in the proposed revised critical habitat units. The remaining 18 critical habitat units that were not vacated would

still require section 7 consultation under the adverse modification standard. Additionally, because the vacated units are considered to be occupied by the Piping Plover, proposed federal actions would likely still trigger section 7 consultation in those areas.

Baseline costs for conservation of the species in the 18 proposed revised critical habitat units, identified in the 2008 economic study, would continue until the species is no longer listed. Recovery is anticipated by 2020, so those annual costs of \$0.8 to \$4.5 million would total to about \$9.6 to \$54 million over the next 12 years.

Regardless of Piping Plover recovery, most baseline costs would persist until recovery of the five species of sea turtles is achieved.

3.8.2.2 Alternative B - Proposed Action

Designation of revised critical habitat would not affect community services nor community cohesion. No residences or businesses would be displaced. Community resources such as schools, fire protection, law enforcement, and medical services would not change as a result of designation of critical habitat. As no measurable detrimental effects from the designation of critical habitat are anticipated in regards to communities or individuals (*e.g.*, loss of homes, businesses, or jobs; disruption of community services or community cohesion), there would be no disproportionate adverse effects on low-income or minority populations. The proposed action is in compliance with E.O. 12898.

The proposed action would designate 138,881 acres of critical habitat in nine counties. Table 15 shows the size of each county in acres, the number of acres of critical habitat proposed by county, and the percent of total area of each county that would become critical habitat if the proposed action is selected. Willacy County, second smallest county by area, would have the greatest percentage of its area designated as critical habitat for Piping Plover (slightly more than one-tenth of one percent). Kenedy County, the largest county by area, would also have the largest number of acres of critical habitat designated by the proposed action (57,827 acres), but this would amount to less than 0.07 percent of the county's total area (Table 15).

Table 15. Acres of proposed critical habitat for wintering Piping Plover by county. Proposed critical habitat acres are approximate; therefore total county acreage does not add exactly to total acres identified in the May 2008 proposed rule.

Location	Total Area (Acres)	Proposed Critical Habitat Acres*	Percent of Total Area
Aransas County	10,977,120	4,538	0.041%
Willacy County	34,194,600	35,327	0.106%
Calhoun County	44,943,550	2,685	0.006%
Kleberg County	47,480,400	269	0.001%
Nueces County	50,834,520	2,018	0.004%
Cameron County	55,626,120	20,468	0.055%
Brazoria County	69,608,880	954	0.001%
Matagorda County	70,218,720	3,786	0.005%
Kenedy County	84,767,760	57,827	0.068%

About 28,190 acres (20.3 percent) of the proposed revised critical habitat is on federal lands (Table 3) and is managed as part of three national wildlife refuges. Another 76,932 acres (55.4 percent) are state lands, primarily managed by the Texas General Land Office. Three areas of state land are under the management of Texas State Parks and Wildlife Department (Mustang Island State Park, Peach Point-Bryan Beach Wildlife Management Area, and Matagorda Island Wildlife Management Area). Thirty-three acres (less than one percent) are managed by local governments as Andy Bowie County Park (28 acres) on South Padre Island and Port Aransas Park (five acres) on Mustang Island. The remaining 33,716 (24.3 percent) of proposed critical habitat is private land.

No changes in land use are expected to occur as a result of implementation of the proposed action. Federal and state wildlife areas and refuges would continue to be managed for species protection. State and local park management would not change as a result of critical habitat designation. As discussed in section 3.6, state lands managed by the Texas General Land Office and private lands could continue to be developed in accordance with state and local laws and ordinances. Since residential and commercial development of beaches is prohibited under Texas law, critical habitat designation would not be likely to place additional restrictions on development activities.

The economic study of the effects of the proposed critical habitat designation did not identify loss of jobs or reduction of industry production in any of the nine counties in which revised critical habitat is proposed. The study estimated an annual cost of \$595,000 to \$5.07 million (discounted at seven percent) as a result of designation of revised critical habitat for the wintering Piping Plover in Texas (Industrial Economics, Inc., 2008: ES-2). About 98 percent of these projected costs are

attributed to oil and gas production, while the remainder is split between recreation activities and residential and commercial development. These projected costs are discussed in more detail in the previous sections of this chapter related to each of these three activities. As noted in section 3.2, the recovery plans for the Piping Plover anticipate the species recovery by 2020. Therefore, total costs for implementing the proposed action would be approximately \$7.14 to \$60.84 million during the next 12 years.

The economic analysis of proposed revised critical habitat designation for wintering Piping Plover in Texas does not include any quantified benefits that may occur with revised critical habitat designation for the 18 vacated units. The report references only that “the Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking” (Industrial Economics, Inc., 2008:2-17). However, public comments on the proposed rule provided during the scoping period identified concerns that benefits of critical habitat designation were generally not portrayed in previous economic analyses for critical habitat proposals for other listed species. As described in section 1.7, the need to analyze potential benefits is considered a public issue.

As discussed in section 3.2, designation of critical habitat does have benefits to conservation of wintering Piping Plover and further its recovery. Recovery of the species would eliminate all costs associated with Section 7 compliance. Piping plover conservation benefits may extend to other species and further the conservation of the Texas coastal ecosystems by identifying important habitat areas and focusing attention on conservation of habitat elements that are essential for Piping Plover and numerous other bird species that use the same habitats. The Texas Gulf coast between Brownsville and Houston is renowned

for its diverse habitats that support hundreds of species of birds, many of which, can only be observed in the U.S. within this region. Protecting habitat for the Piping Plover in Texas provides a unique opportunity for the public to observe not only the Piping Plover but many other unique bird and animal species that cannot be seen in other parts of the nation.

Numerous studies and articles during the past decade have identified the growing importance of tourism in Texas and have recognized ecotourism, or nature-based tourism, as one of the fastest growing components of tourism (Mathis and Matisoff, 2004). However, as the financial contribution of tourism is divided among several industry sectors, such as retail trade, manufacturing, entertainment, recreation, and hospitality, and other services, quantifying tourism's contributions can be difficult.

A new report by the U.S. Fish and Wildlife Service (Leonard, 2008) estimates that 4.2 million people participated in wildlife-watching in Texas in 2006. In that year, Texas had the third largest number of wildlife-watching participants of the 50 states. Direct expenditures for wildlife-watching in the state were estimated to be almost \$3 million. This, in turn, generated about \$5.2 million in total industrial output in Texas of the \$122.6 billion generated in the U.S. that year by wildlife-watchers (Leonard, 2008). Of the three national wildlife refuges that manage land within the proposed critical habitat units (San Bernard, Aransas/Matagorda Island, and Laguna Atascosa), wildlife-watching and photography are activities in which at least half to nearly all refuge visitors participated from 2002 through 2007 (Figure 31).

Wildlife-watching contributed almost 50,000 jobs to the Texas economy in 2006 (Leonard, 2008). Based on the total U.S. job-related employment figures for wildlife-watching, about 34 percent of these jobs were in retail trade, and 11 percent

were in the accommodation and food services sector. The real estate, rental, and leasing sector and arts, entertainment, and recreation sector contributed about seven and six percent of these jobs, respectively.

Texas has long been recognized as a top destination for birders. Birding.com identifies 17 sites in Texas in its "Top 200 North American Birding Hot Spots" (www.birding.com). The Great Texas Coastal Birding Trails, developed by Texas Parks and Wildlife Department and completed in 2000, pass through all nine counties in the area of analysis.

All of the nine counties in the area of analysis identify some aspect of ecotourism as important to their economies. Historically, fishing and birding were the main draws, but more recently local governments are capitalizing on other species, including viewing butterflies, dragonflies, reptiles, and mammal,. In 2008, Texas will host 25 bird or other nature festivals; 11 of these are held in one or more of the nine-county analysis area (Texas State Parks and Wildlife Department, 2008). In the early years of the 15-year-old annual Rio Grande Valley Bird Festival held in Harlingen (Cameron County), a study determined that each attendee spent an average of \$1,353 within the Lower Rio Grande Valley during a 12-month period (Eubanks and Stoll, 1999). With annual attendance of ranging from 1,000 to 4,000 persons since 1998 (Ilza Torres, Harlingen Chamber of Commerce, pers. comm., 30 November 2008), the Harlingen area receives a healthy contribution from the festival each year.

Recognition of the potential economic boon of ecotourism has prompted development of programs and facilities to attract wildlife-watchers, particularly birders. Matagorda County promotes its Birding and Nature Center as having the highest number of bird species counted during the Annual Christmas Bird Count (235 in 2000).

The King Ranch, the largest ranch in Texas with property in four of the nine-county analysis area (Nueces, Kleberg, Kenedy, and Willacy counties), has been providing wildlife and birding tours since 1995. Port Aransas (Nueces County) promotes six birding sites on Mustang Island, including a birding center in Port Aransas.

In the Lower Rio Grande Valley, which includes Cameron and Willacy, the World Birding Center opened its \$7 million headquarters in 2004 and now has nine facilities across four counties. A feasibility study for the World Birding Center conducted in the mid-1990s determined that for every additional 10,000 visitors brought to the Valley, economic benefits would include: 1) \$3.8 million in direct expenditures; 2) \$9.3 million in gross economic output; 3) 156 full-time jobs; and 4) \$0.7 million in state and local taxes (Eubanks, 2003).

3.9 Cumulative Effects

Cumulative effects are the effects from other projects that are not part of this proposed action, which may have an additive effect when combined with the effects expected from the proposed action. The geographic extent for which cumulative effects are considered vary for each resource. The past, present, and reasonably foreseeable future actions in the proposed critical habitat analysis area that, combined with the proposed action, could contribute to cumulative effects include:

- effects of listing, critical habitat designation, and section 7 consultations for other species and other designated critical habitats; and
- existing land management policies and plans.

Effects of proposed critical habitat designation on most resource areas generally consist primarily of

the potential for minor increases in federal agency staff effort during section 7 consultations to incorporate critical habitat considerations and addition of discretionary conservation measures to reduce impacts to primary constituent elements. These potential impacts are not likely to result in substantial cumulative effects, when added to the effects of existing section 7 consultations for other species and existing land management plans and policies.

3.10 Relationship Between Short-Term and Long-Term Productivity

Proposed revised designation of critical habitat for wintering Piping Plover along the Texas coast is a programmatic policy that would have no effect on short-term or long-term productivity.

3.11 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments of resources are those effects that cannot be reversed. For example, the extinction of a species is an irreversible commitment. Irretrievable commitments of resources are those that are lost for a period of time, but may be reversed, such as building a shopping center on farmland. The land cannot be used for farming again until the pavement is removed and soils are restored to productivity. Designation of critical habitat for wintering Piping Plover along the Texas coast would result neither in irreversible or irretrievable commitments of resources.

4.0 COUNCIL ON ENVIRONMENTAL QUALITY ANALYSIS OF SIGNIFICANCE

Pursuant to the Council on Environmental Quality regulations for implementing NEPA, preparation of an environmental impact statement is required if an action is determined to significantly affect the quality of the human environment (40 CFR §1502.3). Significance is determined by analyzing the context and intensity of a proposed action (40 CFR §1508.27).

Context refers to the setting of the proposed action and includes consideration of the affected region, affected interests, and locality (40 CFR §1508.27[a]). The context of both short- and long-term effects of proposed designation of critical habitat are the proposed critical habitat subunits and the surrounding areas. The effects of proposed critical habitat designation at this scale, although long-term, would be small.

Intensity refers to the severity of an impact and is evaluated by considering ten factors (40 CFR §1508.27[b]). The intensity of potential impacts that may result from designation of revised critical habitat for wintering Piping Plover along the Texas coast under Alternatives A or B is low.

- The potential impacts may be both beneficial and adverse, but minor.
- There would be no effects to public health or safety from proposed designation of critical habitat, and the proposed action would not affect unique characteristics of the geographic area.
- Potential impacts from critical habitat designation on the quality of the environment are unlikely to be highly controversial and do

not involve any uncertain, unique, or unknown risks.

- Proposed designation of critical habitat for wintering Piping Plover along the Texas coast does not set a precedent for future actions with significant effects and would not result in significant cumulative impacts.
- Significant cultural, historical, or scientific resources are not likely to be affected by proposed designation of critical habitat.
- Proposed critical habitat designation may have a beneficial effect on wintering Piping Plover along the Texas coast, particularly with respect to recovery of the endangered Great Lakes breeding population.
- Proposed critical habitat designation would not violate any federal, state, or local laws or requirements imposed for the protection of the environment.

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APPENDIX - COASTAL ECOSYSTEM FEATURES

Figure 34. Diagram of the three coastal ecosystems defined by Zonick (2000: 14): the bay ecosystem, the ecotone, and the lagoon ecosystem. Figure is excerpted from Zonick (2000: 14; Figure 1).

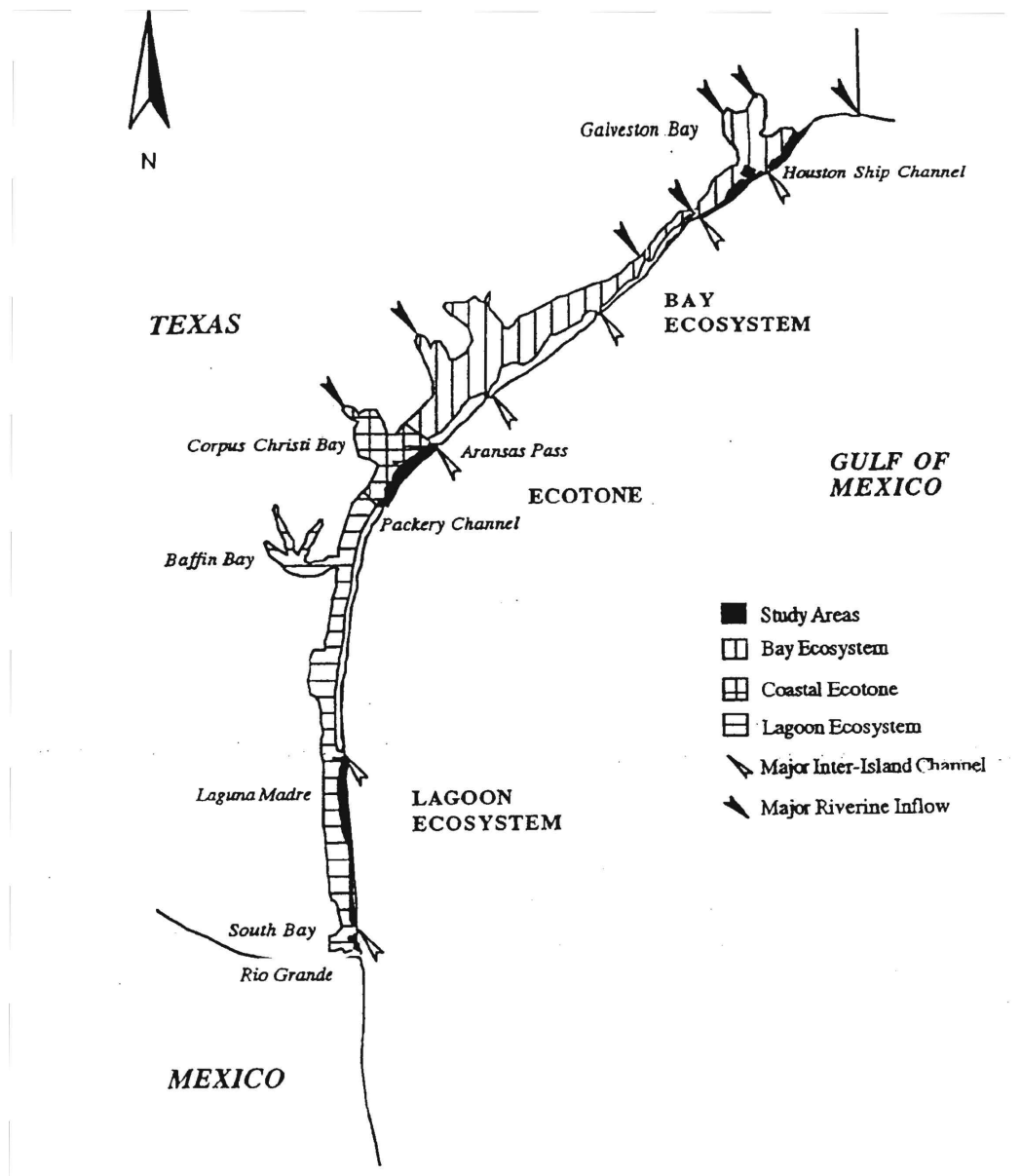




Figure 35. Ocean beach habitat in the bay ecosystem. Photo is at Quintana Beach, taken on 8 January 2008. Photograph credit: J. Pittenger, Blue Earth Ecological Consultants, Inc.



Figure 36. Tidal mud flat habitat in the lagoon ecosystem. Photo taken on 9 January 2008. Photograph credit: J. Pittenger, Blue Earth Ecological Consultants, Inc.



Figure 37. Beach wrack. A Ruddy Turnstone (*Arenaria interpres*) is picking through the wrack for food. Photo taken on 10 January 2008. Photograph credit: K. Yori, Blue Earth Ecological Consultants, Inc.



Figure 38. Habitats in the ecotone. Shallow water inundates algal flats in the center of the photograph. Tidal mud flats are exposed at the bottom of the photograph below a band of cordgrass. Photo is at Aransas National Wildlife Refuge, taken on 14 January 2008. Photograph credit: J. Pittenger, Blue Earth Ecological Consultants, Inc.

